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PLANT OF A WILD SOY BEAN, NO. 22428, GROWN IN A GREENHOUSE.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY—BULLETIN NO. 197.

B. T. GALLOWAY, *Chief of Bureau.*

THE SOY BEAN; HISTORY, VARIETIES,
AND FIELD STUDIES.

BY

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., August 3, 1910.

SIR: I have the honor to transmit herewith and to recommend for publication as Bulletin No. 197 of the series of this Bureau the accompanying manuscript entitled "The Soy Bean; History, Varieties, and Field Studies."

This paper was prepared by Mr. C. V. Piper, Agrostologist, and Mr. W. J. Morse, Scientific Assistant, of the Office of Forage-Crop Investigations.

The soy bean is a striking example of a crop with very numerous varieties, the wealth of which has been largely disclosed by the studies here presented. This crop is already of considerable value in the United States, and there can be but little doubt that it is destined to become of much greater importance, not only for forage, but in all probability for the production of oil and oil cake. The results here presented bring together much information that will be of interest to students and experimenters, and which, it is believed, will be of material assistance to all agronomic investigators.

Respectfully,

G. H. POWELL,
Acting Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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THE SOY BEAN; HISTORY, VARIETIES, AND FIELD STUDIES.

BOTANICAL HISTORY AND IDENTITY OF THE SOY BEAN.

The soy bean was first made known to Europeans by Kämpfer, who spent three years, 1690 to 1692, in Japan. Kämpfer (*Amœnitatum Exoticarum*, 1712, p. 837) gives the Japanese name "Daidso Mame" and describes it as an erect bean, with the pod of a lupine and the seeds like a large white pea. Linnæus (*Flora Zeylanica*, 1747, p. 534) describes the plant briefly under "*Dolichos*" and states that it is cultivated in Ceylon. This last statement is probably an error. He also cites the descriptions of Kämpfer. In 1753 Linnæus repeats the description of the *Flora Zeylanica* and formally names the plant *Dolichos soja*, giving its habitat, however, as India. What Linnæus's Ceylon or India plant may be is not certain, as will appear.

Moench in 1794 rechristened the Linnæan plant *Soja hispida*. Savi in 1824 called the Japanese soy bean *Soja japonica*. Miquel in 1855 named a narrow-leaved form from Java *Soja angustifolia*, and Maximowicz in 1873, using Moench's specific name, published the soy bean as *Glycine hispida*, which name has been generally adopted. Siebold and Zuccarini had previously (1843) named a plant from Japan *Glycine soja*, supposing it to be the *Dolichos soja* of Linnæus. This plant, however, was not the soy bean cultivated by the Japanese but the wild plant later described as *Glycine ussuriensis* by Regel and Maack. Under existing botanical rules, the soy bean, which is known only as cultivated, has been called *Glycine hispida* (Moench) Maximowicz, and its nearest relative *Glycine soja* Siebold and Zuccarini (*G. ussuriensis* Regel and Maack). Maximowicz considered that the soy bean was probably derived from the latter by cultivation, but this idea has not generally been accepted.

Glycine soja (Pls. I and II), as heretofore known, differs from *G. hispida* in its more slender and more vining stems, in being less hairy, in bearing smaller pods and seeds, and especially in having smaller flowers. The flower is 3 to 5 mm. long, while that of *G. hispida* is 6 to 7 mm. The structure of the flower is the same in both, but the calyx lobes are usually longer in proportion to the tube in *G. hispida* than in *G. soja*. It is apparent, therefore, that the fundamental differences between the species are slight. The smaller flower we

regard as the best single character to separate *G. soja* from *G. hispida*, but using this as a criterion *G. soja* is also a cultivated species.

Among numerous lots of seeds received from India (S. P. I. Nos. 24672 to 24693, inclusive) representing seven varieties, there are at least two (see Nos. 24675 and 24682) which have very small flowers, 3 mm. long, indistinguishable from those of the wild *G. soja* that we have grown. Typical plants of *Glycine soja* obtained from the Botanic Garden, Tokyo, Japan (S. P. I. No. 22428), and from Soochow, Kiangsu, China (S. P. I. No. 25138), have been grown three seasons. The India plants are coarser stemmed, less vining, and bear somewhat larger pods and seeds, but the flowers are much smaller than those of any variety of *G. hispida* and precisely like those of *G. soja*. Other numbers from India are probably *G. hispida*, but the flowers are somewhat smaller than the Japanese varieties and the pods and seeds as small as any variety of *G. hispida*. It is therefore apparent that both *G. soja* and *G. hispida* are cultivated in parts of India, if we accept the flower character as decisive. This fact makes it doubtful which of the two plants Linnæus named *Dolichos soja*. There seems no good reason why *G. hispida* may not have been derived from *G. soja* by cultivation, the smaller flowers of the latter being the principal difficulty to explain. In all other respects the two supposed species seem to merge completely. The identity of the plant cultivated in India has been commented on by Watt (Dictionary of the Economic Products of India, 1890, p. 509) as follows:

Reference having been made to the authorities of the Calcutta Herbarium on the subject of *G. soja*, Sieb. et Zucc., being, as shown in the Flora of British India, a native of this country, Dr. Prain kindly went into the subject very carefully. He writes: "We have not, from any part of India, any specimens of *G. soja* proper. The Khasi Hills plant is more erect, more hispid, and has larger legumes than the Himalayan, and indeed resembles *G. hispida*, Maxim., quite as much as it does the Indian cultivated '*G. soja*,' which, indeed, it connects with *G. hispida*. It is, in fact, the plant most like the wild *G. soja*, S. et Z., which no one ever professes to have found wild in India, while it is also the one most like *G. hispida*, Maxim. (which has never been found wild anywhere). It is the plant collected by Dr. Watt and myself in the Naga Hills."

The writer noted on his Naga Hill specimens that they were found in a semiwild state, and that the plant was known to the Angami Nagas as *Tsu Dza*, a name not unlike *soja*. Throughout India, the soy bean is cultivated, black and white seeded forms being met with, which vary to some extent, but all preserve the specific characters of *G. hispida*. Plants raised at Saharunpur from Japanese seed have larger and broader leaves than the usual Indian forms. The fact that this cultivated plant possesses, even among the aboriginal tribes, names which are original, i. e., in no way modern derivatives, points to an ancient cultivation, if, indeed, it may not be accepted as an indication of its indigenous nature. (Editor.)

Prain apparently does not apply the size of the flower as a critical character. Applying this, however, two of the Indian varieties (see

Nos. 24675 and 24682) are certainly *Glycine soja*, but the plants are stouter and less twining, and the pods and seeds larger than the wild form from Japan. Three other varieties (Nos. 24672, Khasi Hills, and 24673 and 24674, Darjiling) we would refer to *G. hispida*, though the flowers are somewhat smaller than the Japanese and Chinese varieties. The first is erect and bushy, but the other two are procumbent and vining. A variety from Taihoku, Formosa, No. 24642, is very similar to the two varieties from Darjiling. On the whole, we are therefore inclined to believe that there is but one botanical species, which has been profoundly modified by cultivation.

BOTANICAL CLASSIFICATIONS OF SOY-BEAN VARIETIES.

The numerous varieties of soy beans have led some botanists to give them botanical designations, but these for the most part have been ignored by later writers.

Roxburgh (catalogue, p. 55) described a variety in the Calcutta Botanical Garden as *Soja hispida pallida*, stating that it had yellow flowers and white seeds. Voigt (Hortus Suburbanus Calcuttensis, p. 231) apparently redescribes the same plant as *Soja hispida leucosperma*. There is perhaps an error here as all of the varieties of soy beans grown by us have either white or purple flowers and none have truly white seeds.

Martens (Die Gartenbohnen, 1869) discusses the soy bean under the name *Soja hispida* Moench and gives a classification of thirteen varieties that he had secured from various sources, of which he apparently grew but one. He divides the species into three subspecies based on the form of the seed, under which the varieties are named according to the color of the seed.

I. *Soja elliptica* Martens. Seeds oval.

1. *S. elliptica nigra*. Seeds black; obtained from Shanghai and Paris.
2. *S. elliptica castanea*. Seeds brown; obtained from Chefoo, Venice, and Berlin.
3. *S. elliptica virescens*. Seeds greenish yellow; obtained from Paris.
4. *S. elliptica lutescens*. Seeds yellow; obtained from Chefoo.

II. *Soja sphaerica*. Seeds globose.

5. *S. sphaerica nigra*. Seeds black, large; obtained from Japan.
6. *S. sphaerica minor*. Seeds black, small; obtained from Japan and Sumatra.
7. *S. sphaerica virescens*. Seeds greenish; obtained from Shanghai and Yokohama.
8. *S. sphaerica lutescens*. Seeds yellow, large; obtained as "New Japan peas" from Norway. This is identified as var. *pallida* of Roxburgh.
9. *S. sphaerica minima*. Seeds yellow, small; obtained from Yokohama.

III. *Soja compressa*. Seeds compressed.

10. *S. compressa nigra*. Seeds black, very large; obtained from Yokohama.
11. *S. compressa parvula*. Seeds black, small; obtained from Chefoo.
12. *S. compressa virescens*. Seeds greenish; obtained from Berlin as *Soja ochroleuca* Bouché.
13. *S. compressa zebrina*. Seeds brown banded with black; obtained from the Berlin Botanic Garden.

Harz (*Zeitschrift des Landw. Vereins Bayern*, 1880, and *Landwirtschaftliche Samenkunde Handbuch*, 1885) gives an even more elaborate classification than Martens of the varieties of *Soja hispida*, dividing the species into two subspecies on the form of the pod, and numerous varieties on the shape and color of the seeds, but it is not apparent that he grew the plants. His grouping is as follows:

Soja platycarpa Harz. Flat-podded soy beans.

1. *olivacea* Harz. Seeds olive-brown.
2. *punctata* Harz. Seeds olive, speckled with brown.
3. *melanosperma* Harz. Seeds black, elongate (*Soja compressa nigra* Martens).
 - a. *vulgaris*. Hilum flat; seeds $9.1 \times 5.5 \times 3.5$ mm.
 - b. *renisperma*. Hilum concave; seeds $10.1 \times 5 \times 3.8-4$ mm.
 - c. *nigra*. (*Soja elliptica nigra* Martens.) Seeds little compressed, $11 \times 5.1 \times 4.4$ mm.
 - d. *rubrocincta*. Like the preceding, but dark red about the hilum.

4. *platysperma* Harz. Seeds black, flat.

5. *parvula* Martens. Seeds black, small.

Soja tumida Harz. Swollen-podded soy beans.

6. *pallida* Roxb. Seeds yellow or yellowish.

7. *castanea* (*Soja elliptica castanea* Martens). Seeds brown.

8. *atosperma* Harz. (*Soja sphaerica nigra* and *S. sphaerica minor* Martens.) Seeds black.

This classification differs from that of Martens primarily in recognizing two main groups based on the shape of the pod rather than three groups based on the form of the seed.

While either the system of Martens or that of Harz will classify the material, they are of little value either botanically or agronomically. To accommodate the much larger number of varieties we have studied, either scheme would need to be elaborated greatly. Furthermore, there are all possible intergrades between flat pods and tumid pods, as also between oval, globose, and compressed seeds. Botanically speaking, the form of the pod and the color and form of the seeds is of little significance. Agronomically the habit and size of the plants are much more important characters, and in many cases varieties very different in these respects have closely similar seeds.

VARIETAL CHARACTERISTICS OF SOY BEANS.

The characters that distinguish soy-bean varieties may be considered under the following categories:

HABIT OF GROWTH.

All soy beans are strictly determinate as to growth; that is, the plants reach a definite size according to environment and then mature and die. The great majority of the varieties are erect and branching, with a well-defined main stem. (Pls. II and III.) The branches may all be short, or the lower ones elongated, either spreading or ascending.

In other varieties the stems and branches, especially the elongated terminals, are more or less twining and usually weak, so that the plant is only suberect or even procumbent. (Pls. I, II, and III.) In the bushy forms the internodes may be short, in which case the pods are more or less densely crowded or elongated, causing the pods to be scattered. Varieties with elongated internodes are usually slender and the pods small, but this is by no means universal. The form of the plant may be greatly modified by thickness of planting, as the development of the branches is inhibited by close planting and encouraged by isolation.

FOLIAGE.

There is wide variation in the leaves of soy beans, involving shape, size, color, and degree of persistence. These characters merge by insensible degrees, so that they are useful in differentiating varieties only in extreme cases. In shape, the leaflets are usually ovate-lanceolate, but in some varieties are narrowly lanceolate or almost linear; in others, nearly orbicular. They vary in length from 1 inch to 5 inches. In color they are usually pale, but some are dark green.

In nearly all varieties of soy beans the leaves commence to turn yellow as the pods begin to ripen and commonly all have fallen when the pods are mature. On this account it is difficult to harvest the crop for grain and save all the foliage as well, but this is possible with many varieties. A few sorts, like the Wisconsin Black, retain their leaves green until all or nearly all of the pods are mature.

Additional leaflets occur not uncommonly in several varieties. This seems to be especially true with early sorts from Siberia, on which leaves with four or five leaflets are frequently seen.

PUBESCENCE.

All soy beans are hairy plants, and there is but little difference in the amount of hairiness. No smooth variety has thus far been obtained, the nearest approach to it being No. 22876, from Tokyo, Japan. The pubescence occurs in two colors, white or gray and tawny, which behave in Mendelian fashion, the tawny being dominant. The tawny pubescence is nearly always on tawny-colored or dark pods and the white pubescence on grayish pods. Many cases occur where two varieties differ wholly or mainly in the color of the pubescence. In some instances these have been segregated; in others the mixture is evident. In such cases one color usually predominates, the presence of the other being due to casual hybridization.

FLOWERS.

Soy-bean flowers occur in two colors, purple and white. Certain varieties can be distinguished most readily by this character. In a number of the lots tested both colors of flowers occur, the plants

otherwise resembling each other very closely. Two strains of this sort can, however, be readily separated. Roxburgh (Catalogue, p. 55) and Voigt (*Hortus Suburbanus Calcuttensis*, p. 231) each describe a variety with white seeds and yellow flowers. Such may really exist, but there is no hint of yellow flowers in the 290 varieties we have studied.

Most soy-bean flowers have no perceptible odor; but Nos. 23336, 23337, and 20797, when in full flower at Jackson, Tenn., September 13, 1909, were very fragrant, the odor suggesting that of lilacs.

The flowers are borne on short axillary racemes, commonly with 8 to 16 in each cluster. In some varieties, however, the racemes may have as many as 35 flowers.

PODS.

In most varieties of soy beans the pods are distinctly compressed, but in some cases cylindric, and all possible intermediate forms exist. (See Pls. VI and VII.) The number of seeds per pod in most varieties is 2 to 3. In a few sorts, however, the number is 3 to 4. Wein (*Journal für Landwirtschaft*, 1881, Supplement (*Ergänzungshaft*), p. 3) speaks of varieties having occasionally 4 to 5 seeds in a pod, but we have never seen but one example of a 5-seeded pod. The largest pods are perhaps those of No. 23213, $2\frac{1}{2}$ to 3 inches long; the smallest, those of No. 17256, three-fourths inch to $1\frac{1}{2}$ inches long.

Many soy-bean varieties shatter their seeds easily. In general, small pods shatter less easily than large pods, but there are exceptions in each case. Among the varieties tested the Peking, No. 17852B, holds its seeds far better than any other. Plates IV and V show the striking differences in this regard.

Soy-bean pods are commonly borne in clusters of 3 to 5. In a few varieties the clusters may contain 12 pods. Depending on the length of the internodes, the pods appear crowded or scattered. A single plant may bear over 400 pods. The color of the pods may be gray or tawny, or rarely black. Gray pods bear white or grayish hairs, while all tawny pods have tawny pubescence. Certain varieties with black pods bear white or grayish hairs.

SEEDS.

The range in size and shape of soy-bean seeds according to variety is well shown in Plate VIII. None are truly globose, but this shape is closely approximated by some varieties. Others are much flattened. The great majority, however, are elliptic in outline, the thickness less than the breadth.

Most varieties of soy beans have unicolored seeds in the following colors, straw-yellow, olive-yellow, olive, green, brown, and black, the last really a dark violet. Straw-yellow seeds are in some varieties

very pale, especially when old, and are sometimes erroneously called white, but no truly white seeds are known in soy beans. In several varieties with straw-yellow seeds, like the Mammoth, the seeds have a greenish tinge if harvested before full maturity, making it difficult to distinguish them from varieties whose fully mature seeds are greenish yellow. The latter again merge by very fine gradations into olive and from this into brown.

Bicolored seeds occur in but few varieties. The commonest are green or yellow with a saddle of black, the latter not sharply delimited. Two varieties have their seeds brindled brown and black, the two colors somewhat concentrically arranged. One variety has black seeds faintly marked with minute brown specks. On heterozygote plants the seeds are often irregularly bicolored, as discussed on another page.

The hilum or seed scar is pale in some varieties and dark in others and therefore often of value to distinguish varieties. In a few varieties, as in Ito San, there is a minute brown spot on the micropyle which is diagnostic.

The germs or embryos of soy-bean seeds are yellow, except in the green-seeded and part of the black-seeded sorts, in which they are green.

FROST RESISTANCE.

Soy beans will withstand considerable frost, both in the spring, when young, and in the fall, when about mature. The trials at the Arlington Experimental Farm, near Washington, D. C., indicated that varieties vary to a considerable degree in this respect. The first frost in the fall of 1909 at this farm came on October 13, the minimum temperature being 31° F. The top leaves of nearly all varieties were slightly touched by this frost. The varieties from India were injured to a greater extent than any of those previously grown. The first killing frost occurred on October 29, 1909, the minimum temperature being 27° F. In the majority of the late and very late varieties the plants were killed. However, several varieties still retained a fair percentage of green leaves, and the pods were but slightly touched. The Riceland and Barchet varieties showed considerable frost resistance, about 50 per cent of the leaves and all the pods remaining green after this later frost. The most resistant variety in the trial was No. 20798E, a selection from No. 20798, Barchet, this variety still having about 70 per cent of green leaves and no pods injured. Those varieties showing any degree of resistance still retained green leaves and pods on November 15, the temperature meantime not reaching the minimum of October 29.

In a variety trial at Muskegon, Mich., in 1909, the Guelph, Ito San, and Ogemaw varieties were found to be quite frost resistant and the

Chernie, Jet, and Meyer extremely sensitive. The comparative resistance of the varieties is reported as follows, the first being least injured: (1) Ogemaw; (2) Haberlandt, Ito San, Kingston, Guelph; (3) Habaro, Shingto, Manhattan, Brindle; (4) Jet; (5) Meyer, Chernie.

It may be that the same variety varies in frost resistance, depending on its stage of maturity. In the foregoing list, however, the Ogemaw, though very early, usually matures with the Manhattan and the Chernie, while the Haberlandt is fifteen days later.

PERIOD OF MATURITY.

In soy beans there is a continuous succession of varieties from very early to very late. With very few exceptions, earliness is correlated with size, the largest varieties being latest. As in the cowpea, early plantings take a longer time to mature than late plantings, but there is by no means a consistent behavior in the different varieties in this respect. In general, the later the variety the more is its life period shortened by later planting.

Haberlandt, in 1877, planted one variety at Vienna at intervals of one week through the season and attempted to correlate the life periods obtained with the amount of heat. His results are shown in Table I.

TABLE I.—*Results of planting a single variety of soy bean at different dates, Vienna, Austria, 1877.*

Date of planting.	Date of harvest.	Life period.	Total heat required—		
			Until germination.	Until blossoming.	Until maturity
		<i>Days.</i>	<i>° C.</i>	<i>° C.</i>	<i>° C.</i>
March 31.....	September 29.....	182	230	1,185	2,972
April 7.....	do.....	175	294	1,102	2,893
April 14.....	do.....	167	189	1,008	2,787
April 21.....	do.....	160	217	1,026	2,753
April 28.....	do.....	153	228	995	2,701
May 5.....	October 15.....	163	209	936	2,811
May 12.....	do.....	156	221	960	2,722
May 19.....	October 18.....	152	275	1,043	2,641
May 26.....	do.....	145	153	985	2,519
June 2.....	do.....	138	152	871	2,405
June 9.....	October 26.....	139	130	739	2,322

Prof. C. A. Mooers, of the Tennessee Agricultural Experiment Station, has conducted extensive experiments of a similar kind. The following table gives some of his results:^a

TABLE II.—*Life period of soy-bean varieties planted at intervals of two weeks for two consecutive years at the Tennessee Agricultural Experiment Station.*

Variety.	1907.			1908.		
	Date planted.	Date harvested.	Life period.	Date planted.	Date harvested.	Life period.
			<i>Days.</i>			<i>Days.</i>
Mammoth.....	April 3.....	October 5.....	186	April 2.....	October 7.....	188
	April 15.....	.....do.....	173	April 14.....	.....do.....	179
	April 30.....	October 6.....	160	May 1.....	.....do.....	159
	May 15.....	October 9.....	146	May 15.....	.....do.....	145
	June 5.....	October 12.....	129	June 1.....	.....do.....	128
	June 17.....	October 22.....	127	June 17.....	October 21.....	126
	June 29.....	.....do.....	113	July 1.....	.....do.....	112
	July 15.....	October 28.....	105	July 16.....	October 24.....	100
	April 3.....	September 13.....	164	April 2.....	August 15.....	135
	April 15.....	.....do.....	151	April 14.....	September 7.....	146
Medium Yellow.....	April 30.....	.....do.....	137	May 1.....	September 14.....	136
	May 15.....	September 18.....	135	May 15.....	.....do.....	122
	June 5.....	September 20.....	107	June 1.....	September 19.....	110
	June 17.....	September 27.....	102	June 17.....	September 23.....	98
	June 29.....	.....do.....	90	July 1.....	September 28.....	89
	July 15.....	October 9.....	86	July 16.....	October 17.....	93
	August 6.....	October 29.....	84	August 1.....	October 24.....	85
	April 3.....	August 9.....	129	April 2.....	July 25.....	114
	April 15.....	.....do.....	117	April 14.....	July 29.....	106
	April 30.....	.....do.....	102	May 1.....	August 5.....	96
Ito San.....	May 15.....	August 17.....	93	May 15.....	August 15.....	92
	June 5.....	September 3.....	90	June 1.....	August 27.....	87
	June 17.....	September 18.....	93	June 17.....	September 10.....	85
	June 29.....	.....do.....	81	July 1.....	September 19.....	80
	July 15.....	October 9.....	85	July 16.....	October 6.....	82
	August 6.....	October 29.....	84	August 1.....	October 24.....	85

A large list of varieties has been grown for several years past at the Arlington Experimental Farm, planted each year during the first week in June. In period of maturity nearly all the varieties behave consistently from season to season, as indicated in Table III, on the following page.

^a Bulletin 82, Tennessee Agricultural Experiment Station, December, 1908.

TABLE III.—*Life periods of soy beans grown at the Arlington Experimental Farm, near Washington, D. C., for three or four seasons.*

Variety.	1905.			1907.		
	Date planted.	Date harvested.	Life period.	Date planted.	Date harvested.	Life period.
			<i>Days.</i>			<i>Days.</i>
No. 14952, Shanghai.....				June 5	October 20....	137
No. 14953, Edward.....				do.....	October 15....	132
No. 14954, Acme.....				do.....	do.....	132
No. 16789, Brooks.....				do.....	October 7.....	124
No. 16790, Cloud.....				do.....	do.....	124
No. 17251, Buckshot.....	June 3	September 14..	103	do.....	September 16..	103
No. 17252, Flat King.....	do.....	October 19.....	128	do.....	October 15.....	132
No. 17253, Nuttall.....	do.....	September 25..	114	do.....	September 30..	117
No. 17254, Ebony.....	do.....	October 3.....	122	do.....	October 6.....	123
No. 17255, Kingston.....	do.....	September 25..	114	do.....	September 30..	117
No. 17256, Brownie.....	do.....	October 2.....	121	do.....	October 7.....	124
No. 17257, Eda.....	do.....	September 23..	112	do.....	September 30..	117
No. 17258, Ogemaw.....	do.....	August 30.....	88	do.....	September 15..	102
No. 17260, Samarow.....	do.....	September 14..	103	do.....	do.....	102
No. 17261, Guelph.....	do.....	September 23..	112	do.....	September 30..	117
No. 17262, Yoshio.....	do.....	September 14..	103	do.....	September 20..	107
No. 17263, Austin.....	do.....	September 30..	119	do.....	October 10.....	127
No. 17264, Tokyo.....	do.....	October 30.....	149	do.....	October 20.....	137
No. 17267, Hope.....	do.....	do.....	149	do.....	October 21.....	138
No. 17268, Ito San.....	do.....	September 24..	113	do.....	September 30..	117
No. 17269, Medium Yellow.....	do.....	October 2.....	121	do.....	October 7.....	124
No. 17271, Haberlandt.....	do.....	September 30..	119			
No. 17273, Butterball.....	do.....	September 7.....	96	June 5	September 30..	117
No. 17275, Amherst.....	do.....	September 25..	114	do.....	October 5.....	122
No. 17277, Manhattan.....	do.....	September 7.....	96	do.....	September 30..	117
No. 17278, Hollybrook.....	do.....	October 14.....	133	do.....	October 20.....	137
No. 17280, Mammoth.....	do.....	October 28.....	147	do.....	October 25.....	142
No. 17861, Jet.....				do.....	September 30..	117
No. 18227, Chernie.....				do.....	do.....	117

Variety.	1908.			1909.		
	Date planted.	Date harvested.	Life period.	Date planted.	Date harvested.	Life period.
			<i>Days.</i>			<i>Days.</i>
No. 14952, Shanghai.....	June 6	October 25.....	141	June 2	October 30....	150
No. 14953, Edward.....	do.....	October 28.....	144	do.....	November 5....	156
No. 14954, Acme.....	do.....	October 20.....	136	do.....	October 25.....	145
No. 16789, Brooks.....	do.....	October 8.....	124	do.....	October 9.....	129
No. 16790, Cloud.....	June 9	October 7.....	120	do.....	do.....	129
No. 17251, Buckshot.....	do.....	September 16..	99	June 7	September 15..	100
No. 17252, Flat King.....	do.....	October 15.....	128	June 2	October 16.....	136
No. 17253, Nuttall.....	do.....	October 8.....	121	June 7	October 4.....	119
No. 17254, Ebony.....	do.....	do.....	121	June 2	do.....	124
No. 17255, Kingston.....	do.....	October 5.....	118	do.....	do.....	124
No. 17256, Brownie.....	do.....	October 8.....	121	do.....	do.....	124
No. 17257, Eda.....	do.....	October 1.....	114	June 7	September 27..	112
No. 17258, Ogemaw.....	do.....	September 22..	105	do.....	do.....	112
No. 17260, Samarow.....	do.....	do.....	105	do.....	do.....	112
No. 17261, Guelph.....	do.....	October 5.....	118	June 2	do.....	117
No. 17262, Yoshio.....	June 8	September 21..	104	June 7	September 24..	109
No. 17263, Austin.....	do.....	October 9.....	123	June 2	October 16.....	136
No. 17264, Tokyo.....	June 6	October 20.....	134	do.....	October 30.....	150
No. 17267, Hope.....	do.....	do.....	134	do.....	October 29.....	149
No. 17268, Ito San.....	June 8	September 22..	106	June 7	October 2.....	117
No. 17269, Medium Yellow.....	do.....	October 9.....	123	June 2	October 4.....	124
No. 17271, Haberlandt.....	do.....	October 5.....	119	do.....	October 9.....	129
No. 17273, Butterball.....	do.....	September 21..	105	June 7	September 27..	112
No. 17275, Amherst.....	do.....	October 5.....	119	June 2	October 4.....	124
No. 17277, Manhattan.....	do.....	September 14..	98	June 7	September 20..	105
No. 17278, Hollybrook.....	June 6	October 12.....	128	June 2	October 18.....	138
No. 17280, Mammoth.....	do.....	October 30.....	146	do.....	October 30.....	150
No. 17861, Jet.....	June 8	October 10.....	124	do.....	October 9.....	129
No. 18227, Chernie.....	June 9	September 30..	112	June 7	September 20..	105

Based on the data from the Arlington Experimental Farm, the varieties may be classified into seven groups according to their life periods:

Very early.....	Maturing in 80 to 90 days.
Early.....	Maturing in 90 to 100 days.
Medium early.....	Maturing in 100 to 110 days.
Medium.....	Maturing in 110 to 120 days.
Medium late.....	Maturing in 120 to 130 days.
Late.....	Maturing in 130 to 150 days.
Very late.....	More than 150 days.

CHANGES IN LIFE PERIOD.

Ball, in Bulletin 98 of the Bureau of Plant Industry, page 8, cites the case of *Agrostology* No. 1299 (S. P. I. No. 17276), obtained from France in 1902, as illustrating that a variety may progressively change from early to late. According to Ball's records, this variety matured at the Arlington Experimental Farm in 1902 in 95 days; in 1903, in 120 days; in 1905, in 130 days. On the other hand, at Knoxville, Tenn., the record of this variety is perfectly consistent from year to year and it matures with the Buckshot, a very early variety.^a Planted August 2, 1906, both matured in 70 days; planted May 25, 1907, both matured in 91 days; planted July 11, 1907, both matured in 81 days; planted July 30, 1907, both matured in 84 days; planted May 13, 1908, both matured in 80 days; planted July 17, 1908, both matured in 82 days.

No. 1299 was not grown at the Arlington Experimental Farm after 1905 until 1909, when seed was obtained from the Tennessee Agricultural Experiment Station. In this year it matured in 100 days, exactly the same as required for Buckshot that had been grown continuously at Arlington.

It seems difficult to reconcile these results with those reported by Ball, but the subject needs further investigation.

In the case of the Ogemaw variety, phenomena have occurred that are precisely like those reported by Ball. As shown by Table III, this variety required the following periods to mature at the Arlington Experimental Farm: In 1905, 88 days; in 1907, 102 days; in 1908, 105 days; in 1909, 112 days. In all these years the variety remained perfectly uniform and no variants have ever been found in it. In 1909 seed of this variety was secured from several sources to see if any changes in its life period, which was suspected from its increasing lateness at Arlington, had actually occurred. The results are shown in Table IV. All of these lots of the Ogemaw variety came from the same original source, namely, Mr. E. E. Evans, West Branch, Mich.

^a Bulletin 82, Tennessee Agricultural Experiment Station, p. 81, 1908.

The limited amount of data concerning three other varieties indicate that Butterball has likewise become later at Arlington or earlier at the Minnesota Agricultural Experiment Station, while no change has taken place in Buckshot and Manhattan.

TABLE IV.—*Variation in life periods of four soy-bean varieties, apparently due to place effect.*

Variety.	Serial No.	Period of maturity at the Arlington Experimental Farm, 1909.	Source of seed.
		<i>Days.</i>	
Ogemaw.....	0855	84	Minnesota Agricultural Experiment Station, 1908, where grown 5 years from S. P. I. No. 13502 from Agrostology No. 1992.
Do.....	0854	87	Minnesota Agricultural Experiment Station, 1908, where grown 4 years from Agrostology No. 1992.
Do.....	0856	87	Minnesota Agricultural Experiment Station, 1908, original seed from Kansas in 1900.
Do.....	0857	87	Minnesota Agricultural Experiment Station, 1908, original seed from Michigan in 1903.
Do.....	0858	87	Do.
Do.....	21755	87	Arlington Experimental Farm, 1908, from seed from Paris, France.
Do.....	25212	87	Bremen, Germany.
Do.....	0866	92	Idaho Agricultural Experiment Station, 1908, grown there several years.
Do.....	0865	97	Idaho Agricultural Experiment Station, 1908, original seed from Minnesota Agricultural Experiment Station, 1907.
Do.....	17258	112	Arlington Experimental Farm, 1908, where grown for 6 years.
Buckshot.....	17251	100	Do.
Do.....	0859	101	Minnesota Agricultural Experiment Station, 1908, grown several years from Agrostology No. 1303.
Do.....	0860	101	Minnesota Agricultural Experiment Station, 1908, grown several years from Agrostology No. 1979.
Do.....	0861	101	Minnesota Agricultural Experiment Station, 1908, grown several years from Agrostology No. 1978.
Manhattan....	17277	105	Arlington Experimental Farm, 1908, where grown for 6 years from Agrostology No. 1295.
Do.....	0862	105	Minnesota Agricultural Experiment Station, 1908, where grown for several years from Agrostology No. 1295.
Do.....	8422	117	Arlington Experimental Farm, 1908, from seed grown several years at Illinois Agricultural Experiment Station from Agrostology No. 1199.
Butterball....	0863	105	Minnesota Agricultural Experiment Station, 1908, where grown for several years from Agrostology No. 1197.
Do.....	0864	105	Minnesota Agricultural Experiment Station, 1908, where grown for several years from Agrostology No. 1199.
Do.....	17273	112	Arlington Experimental Farm, 1908, where grown for 6 years from Agrostology No. 1197.

POLLINATION AND HYBRIDIZATION.

The soy-bean flower is completely self-fertile, bagged plants setting pods as perfectly as those in the open. This was tested at the Arlington Experimental Farm in 1909 by bagging 30 plants representing 10 varieties. In no case did the bagged individuals fail to produce as well as neighboring unbagged plants. Ten plants were also inclosed in box screens with similar results.

The flowers are much visited by bees, mainly for the pollen, as but a very small quantity of nectar is secreted. Cross-pollination would be of frequent occurrence were it not that the abundant pollen of each flower covers the stigma almost as soon as the flower opens.

Previous to 1907 the remarkable uniformity of the plats at the Arlington Experimental Farm, except for occasional and evident admixtures, had led to the belief that natural hybrids of the soy bean did not occur. In that year the occurrence of certain oddly colored seeds, smoky green, smoky yellow, brown and yellow, etc., in the bulk seed was noted. These were carefully saved and the resultant rows in 1908 gave diverse progeny, showing that some of the seeds at least were hybrids. In 1908 more than a hundred single-plant selections of supposed hybrids were made and planted in 1909. Some of the results are indicated in Table V.

TABLE V.—*Variations in hybrid soy-bean plants and their progeny at the Arlington Experimental Farm, 1908-1910.*

Serial No.	Hybrid.		Progeny.			
	Color of pubescence.	Color of seed.	Total number of plants.	Color of pubescence.	Color of flower.	Color of seed.
1826.....	Tawny.....	Cloudy green.....	50	Tawny.....	Purple.....	Green, 39; black, 10; cloudy green, 1.
1830.....	do.....	Olive-yellow.....	44	Tawny, 32; gray, 12.....	White.....	Olive-yellow.
1840.....	do.....	do.....	42	Tawny.....	Purple.....	Olive-yellow with black hilum, 2; olive-yellow with seal-brown hilum, 40.
1856.....	do.....	do.....	22	Tawny, 18; gray, 4.....	Some purple, some white.....	Varying from straw-yellow to olive-yellow.
1878.....	do.....	Black with brown specks.....	32	Tawny, 27; gray, 5.....	Purple.....	Black with brown specks, 20; black, 8; brown, 4.
1896.....	Gray.....	Olive-yellow.....	40	Gray, 38; tawny, 2.....	Some purple, some white.....	Olive-yellow.
1901.....	do.....	Straw-yellow.....	33	Gray, 32; tawny, 1.....	White.....	Straw-yellow.
17253 C-1.....	do.....	Olive-yellow.....	8	Tawny, 7; gray, 1.....	do.....	Olive-yellow, 3; brown, 5.
17253 C-3.....	Tawny.....	Black.....	13	Tawny.....	Purple.....	Black, 7; black and brown, 1.
17253 C-4.....	do.....	Brown.....	18	Tawny, 10; gray, 3.....	do.....	Dark brown, 9; light brown, 3; black, 1.
17253 C-5.....	do.....	Olive to brown.....	38	Tawny.....	Some purple, some white.....	Green, 1; olive to brown, 17.
17253 C-6.....	do.....	Straw-yellow.....	40	do.....	do.....	Straw-yellow, 28; brown, 10.
17253 C-7.....	do.....	Olive to brown.....	30	do.....	do.....	Black, 2; olive to brown, 38.
17253 C-8.....	do.....	do.....	30	Tawny, 25; gray, 5.....	do.....	Light brown, 5; olive-green, 25.
17255 A.....	do.....	Green.....	28	Tawny.....	do.....	Green, 22; black, 5; olive-green, 1.
17257 A-1.....	do.....	Brown.....	103	do.....	do.....	Green, 101; green, 1; greenish brown, 1.
17257 A-2.....	do.....	Black.....	26	Tawny, 56; gray, 12.....	do.....	Black, 54; brown, 12; olive, 2.
17257 A-9.....	do.....	Olive-yellow.....	21	Tawny, 19; gray, 7.....	White.....	Olive-yellow, 23; black, 3.
17257 A-10.....	do.....	Brown.....	50	Tawny, 17; gray, 4.....	do.....	Reddish-brown, 17; light brown, 4.
17262 A-1.....	do.....	Olive-yellow.....	96	Tawny, 37; gray, 13.....	do.....	Olive-yellow, dark hilum, 37; pale hilum, 13.
17262 B-1.....	do.....	do.....	58	Tawny, 75; gray, 21.....	do.....	Olive-yellow.
17277 C.....	do.....	Brown.....	72	Tawny, 42; gray, 16.....	Purple.....	Dark brown, 42; light brown, 16.
17852 L-1.....	do.....	Straw-yellow.....	86	do.....	Purple, 56; white, 16.....	Straw-yellow, 54; brown and black, 14; brown, 4.
17852 L-2.....	do.....	Olive-yellow.....	81	do.....	Purple.....	Olive-yellow, 74; brown and black, 10; black, 1.
17852 L-3.....	do.....	Black and brown.....	85	do.....	do.....	Black and brown, 54; brown, 26; black, 1.
17852 L-4.....	Gray.....	Brown.....	88	do.....	Some purple, some white.....	Yellow, 2; light to dark brown, 83.
17852 L-7.....	Tawny.....	Black and brown.....	77	Gray, 84; tawny, 1.....	do.....	Black and brown, 40; brown, 36; yellow, 1.
22379-2.....	do.....	Straw-yellow.....	78	Tawny, 52; gray, 26.....	Purple.....	Straw-yellow, brown and yellow.
22411 A-2.....	do.....	Black and olive.....	26	Tawny.....	do.....	Black, 19; brown to olive, 7.
25161-1.....	do.....	Straw-yellow.....	55	do.....	do.....	Brown, 42; straw-yellow, 13.

It is evident from the diversity of the progeny that the parents were hybrids in all the cases listed. The number of plants grown in each case is too small to secure definite proportions, but it is clear that the color of the pubescence and the color of the seed behave in Mendelian fashion. The same is probably true of the flower color, which was counted in only one case.

There is thus furnished a clear explanation of the origin of many of the new varieties at the Arlington Experimental Farm that were at first mistaken for accidental admixtures. It also accounts for the diversity of the population exhibited in many introduced varieties notwithstanding the apparent uniformity of the seed.

It must not be supposed from the foregoing account that hybrids are common in soy beans. At Arlington the test rows are grown contiguously, so that there is great opportunity for cross-pollination. Nevertheless, the percentage of hybrids that occur is very small, perhaps not one individual in two hundred.

Thus far the hybrid plants have been detected mostly by the color of the seed. In a number of cases none of the progeny has seed similar to the parent; or, in other words, the color of heterozygote seeds is often unstable. Among the most striking of such heterozygote seeds (Pl. VIII) are yellow with a single narrow transverse band of brown; yellow or green, with an irregularly star-shaped brown or black figure centering at the hilum; and green or yellow more or less suffused with a smoky color. Some of the last breed true, but most of them do not.

Heterozygote plants, especially where the seeds are largely or wholly yellow, are often distinguishable by the unusual form of the pods near the tips of the branches. These are more tumid than the other pods and the seeds more crowded. Such pods may also be thinner in texture and much less hairy. Illustrations of this phenomenon are shown in Plate VII.

MUTATIONS.

The origin of new varieties of soy beans without hybridization has apparently occurred in certain cases that have come under our observation. From a theoretical standpoint there can be no doubt that the fundamental diversity in a plant, especially when normally self-pollinated, is brought about by other causes than hybridization. It is self-evident that there must be two different varieties to cross before crossing can become effective in producing new varieties. Most soy-bean varieties when pure remain very constant to type, so that any chance variation is quickly detected. There are two cases in which the evidence is fairly satisfactory that a brown-seeded variety arose as a mutation from a yellow-seeded sort.

Trenton (S. P. I. No. 24610).—This is a brown-seeded variety found by Mr. S. J. Leavell, of Trenton, Ky., in a field of the yellow-seeded Mammoth. Grown side by side at the Arlington Experimental Farm in 1909, the two varieties were indistinguishable by any other character than the seed color.

Riceland (S. P. I. No. 20797).—At the Arlington Experimental Farm this variety has been grown for three seasons, and while it matures but few seeds it is very uniform. At Biloxi, Miss., in 1908, it displayed astonishing diversity. Some plants had very narrow leaves, others very broad, and all degrees of intermediates occurred; some plants were erect, others procumbent; some fruited heavily, others scarcely at all. The seed was saved from individual plants showing the most striking variations, and the resultant plants of each in 1909 were uniform. It is possible that the seed planted at Biloxi contained these forms, but the fact that the same bulk seed gave uniform plants elsewhere indicates that the diversity was a response to the environment. No similar phenomenon has as yet been witnessed in other varieties.

NOMENCLATURE AND CLASSIFICATION.

Most of the varieties of soy beans that were early introduced into the United States received such names as Early Black, Medium Green, Late Yellow, etc., one adjective referring to the period of maturity, the other to the color of the seed. As long as the varieties were few such a system of naming was satisfactory.

In 1907, when the number of varieties had increased to 23, Ball^a recognized the impracticability of such a system of nomenclature and gave single-term appellations to most of the varieties. On this account, several of the older sorts are now known by two or more names.

At the present time there are known about 300 varieties, mostly obtained in the last three years from Asia by the activities of the Office of Seed and Plant Introduction of the Bureau of Plant Industry. In the synopsis of the varieties here presented they are classified (1) by the type of plant into five groups and (2) by the color of the seeds. A brief description is given of each, but only the more important have been given names. It will be noticed that a considerable number of the varieties are not pure, containing two or more closely similar sorts distinguished by the color of the flowers or the color of the pubescence, or both. Thus, the Acme variety is really a mixture of four sorts, namely, white flowered with gray pubescence, white flowered with tawny pubescence, purple flowered with gray pubescence, and purple flowered with tawny pubescence. These all mature together and the

^a Bulletin 98, Bureau of Plant Industry, 1907.

seeds are either identical or distinguishable with great difficulty. Nevertheless, the results secured with other varieties leave no question that all these can be separated and bred true to type.

In regard to the brief descriptions given, a few words of explanation are necessary. Many of the importations proved to be impure lots of seeds. In some cases, especially where the seeds were differently colored, these were separated before planting, and such are definitely indicated. In other cases the mixture was not detected until the plants were grown, or, in a few cases, until the seed was harvested. Where the difference was detected in the field and the plants separated, they are referred to as "field selections." On the other hand, if the selection was merely a separation of seed from the garnered crop, these are spoken of as "seed selections." Both the "seed" selections and the "field" selections are for the most part "mass" selections, and many of them prove still to be impure, containing both tawny and gray-haired, or red-flowered and white-flowered varieties, which, however, mature together. Most of these have not been separated, though in all valuable varieties they should be. Where one or the other of such differences is not recorded, the variety is a pure strain. Where the selections were made the first year that the plants were grown from imported seeds, they may be either accidental admixtures or the result of hybridization at the place where the original seed was grown. If, on the other hand, they were selected two or more years after they were introduced, they are almost certainly the result of hybridization at the Arlington Experimental Farm.

Besides these, many individual or centgener selections have been made; these, however, are not considered in the accompanying descriptions. Except these last, all selections are indicated by the original S. P. I. serial number with a letter added, thus 16790 D.

It will be apparent from the descriptions that many varieties are very similar to one another. Only a comparatively few of them have been named. Very careful field comparisons were made, however, in all cases, so that each description represents a different thing.

In the cases of a number of early S. P. I. introductions, new numbers were assigned to different lots of seed grown from the original. Thus, the original introduction of Ebony was S. P. I. No. 6386 and different lots of its progeny were Nos. 8492, 9414, and 17254. This is indicated in each case. Many of these earlier S. P. I. numbers were also distributed under a series of Agrostology numbers, full keys to their respective identities being given by Ball in Bulletin 98 of the Bureau of Plant Industry, so that their identity with the numbers and descriptions here given can be easily determined.

EARLY AGRICULTURAL HISTORY IN THE UNITED STATES.

The first mention of the soy bean in American literature is by Thomas Nuttall, in the *New England Farmer*, October 23, 1829. Nuttall grew a variety with red flowers and chocolate-brown seeds in the botanic garden at Cambridge, Mass., and from his observations wrote a brief account concerning it. He writes:

Its principal recommendation at present is only as a luxury, affording the well-known sauce, soy, which at this time is only prepared in China and Japan.

In the same journal two years later, November 23, 1831, is an account of the successful culture of the plant at Milton, Mass., the seed having been obtained from Nuttall.

No further mention of the plant in American literature appears until 1853, when a brief account appeared under the name "Japan pea," by A. H. Ernst, Cincinnati, Ohio, as follows:^a

The Japan pea, in which so much interest has been manifested in this country for a year or two past, from its hardihood to resist drought and frost, together with its enormous yield, appears to be highly worthy of the attention of agriculturists.

This plant is stated to be of Japan origin, having been brought to San Francisco about three years since, and thence into Illinois and Ohio. Its habit of growth is bushy, upright, woody, and stiff, branching near the ground, and attaining a height of three or four feet. The leaflets are large, resembling those of an ordinary bean, occurring in sets of three, with long quadrangular stems. The flowers, which are small and white, but rather inconspicuous, sometimes having purple centers.

In the following year, 1854, the Perry expedition brought back two varieties of "soja bean" from Japan, one "white" seeded, the other "red" seeded.^b These, together with the Japan pea, were distributed by the Commissioner of Patents in 1854, and, thereafter, frequent references to the plant occur in agricultural literature under such names as Japan pea, Japan bean, and Japanese fodder plant.^c Most of these articles speak of the plant as the Japan pea, none of them as the soy or soja bean. It is apparent from the early accounts that there were at least two Japan peas, one early enough to mature in Connecticut (Patent Office Report, 1854, p. 194), the other very late (*American Agriculturist*, 1857, vol. 16, p. 10). Judging from all the accounts, we suspect that the early Japan pea may be the Ito San variety, which, however, has red flowers, while the late variety may be the Mammoth. The Ito San is still occasionally called the Japan pea, while the introduction and source of the Mammoth has never been definitely determined. From these early

^a Report of the Commissioner of Patents, Agriculture, p. 224.

^b Report of the Commissioner of Patents, Agriculture, 1854, p. xv.

^c See especially Report of the Commissioner of Patents, Agriculture, 1854, p. 134. *American Agriculturist*, November 1, 1854, p. 120; January, 1857, p. 10; February, 1874, p. 63. *Rural New Yorker*, January 21, 1854, p. 22; January 21, 1858, p. 14. *American Farmer*, January, 1856, p. 57. *The Cultivator*, May 18, 1855.

accounts the Mammoth may well be the "white-seeded" soja bean obtained by the Perry expedition. The "red-seeded soja bean" was perhaps, the Adsuki bean (*Phaseolus angularis*), as no red-seeded soy bean is known.

Prof. G. H. Cook, of New Brunswick, N. J., obtained seed of the soy bean at the Bavarian Agricultural Station in 1878. In the same year Mr. James Neilson^a obtained seeds of several varieties at Vienna, Austria. Both of these gentlemen planted the seeds and gathered crops of the different varieties in 1879. These varieties were without doubt those grown and distributed through Europe by Professor Haberlandt, of Vienna.

A yellow-seeded soy bean was grown at the North Carolina Agricultural Experiment Station in 1882 and reported on in some detail. The source of the variety is not given, but by implication it is the same as the variety stated to be grown by a number of persons in the State, and is probably the Mammoth.^b

Two varieties, one black seeded, the other with white seeds, were grown at the Massachusetts Agricultural Experiment Station in 1888.^c

In 1890 Prof. C. C. Georgeson secured three lots of soy beans from Japan which were grown at the Kansas Agricultural Experiment Station in 1890 and subsequently.^d

Prof. W. P. Brooks, of Amherst, Mass., brought with him from Japan in 1889 a number of soy-bean varieties, including the Medium Green or Guelph, and the Ito San. It is quite certain that other importations of soy beans from Asia were made by others, but no definite records have been found.

Since 1890 most of the agricultural experiment stations have experimented with soy beans and many bulletins have been published dealing wholly or partly with the crop.

VARIETIES INTRODUCED INTO THE UNITED STATES INDEPENDENTLY OF THE DEPARTMENT OF AGRICULTURE OR PREVIOUS TO 1898.

ENUMERATION.

Previous to the numerous introductions by the United States Department of Agriculture beginning in 1898, there were not more than eight varieties of soy beans grown in the United States, namely, Ito San, Mammoth, and Butterball, with yellow seeds; Buckshot and Kingston, with black seeds; Guelph or Medium Green, with green seeds; and Eda and Ogemaw, with brown seeds.

^a Rural New Yorker, 1882, p. 9.

^b Annual Report of the North Carolina Experiment Station, 1882, pp. 116-127.

^c Annual Report of the Massachusetts Experiment Station, 1889, pp. 140-141.

^d Bulletin 19, Kansas Agricultural Experiment Station, p. 200.

It has been possible to determine the history of these, in part at least, which is of value in interpreting the older records.

ITO SAN.

Ito San was among the varieties introduced in 1899 by Prof. W. P. Brooks, of Amherst, Mass., and by him called Early Yellow. Later, Mr. E. E. Evans secured seed of it and in 1902 called it Ito San. Mr. Evans writes that he subsequently secured it "from half a dozen sources in the United States and Japan." The same variety was also among those introduced by Prof. C. C. Georgeson, of the Kansas Agricultural Experiment Station, and grown in 1890^a and subsequent years. This conclusion is based on the identity of nine varieties obtained from the Rhode Island Agricultural Experiment Station in 1903. This station had previously obtained several varieties from the Kansas Agricultural Experiment Station in 1892.^b Three of the varieties from Rhode Island had exactly the same names as those published in Bulletins 19 and 32 of the Kansas Agricultural Experiment Station, namely, Eda Mame, Yellow Soy Bean, and Kiyusuke Daidzu. All three of these are Ito San.

Ball^c gives a list of numerous American sources through which this variety was secured under such names as Yellow, Early Yellow, and Early White. It was also grown at the Virginia Agricultural Experiment Station in 1905 as Japanese pea, as shown by later cultures at the Arlington Experimental Farm of seed from this experiment station.

Among the introductions of the Office of Foreign Seed and Plant Introduction it is represented by No. 6326, received in 1901 from Tokyo, Japan, and No. 21818, obtained from Vilmorin-Andrieux & Co., Paris, France, as "Yellow Etampes." It is quite probable that this is one of the varieties grown by Professor Haberlandt in his experiments, as all of his varieties were grown at Etampes and other places in France.^d We suspect that this is also the variety that was distributed by the United States Patent Office in 1853, as most of the early accounts point to this or a closely similar variety. These accounts refer to it as Japan pea, Japanese pea, Japan bean, and also coffee berry.^e

^a Bulletin 19, Kansas Agricultural Experiment Station, December, 1890.

^b Report, Rhode Island Agricultural Experiment Station, 1892, p. 150.

^c Bulletin 98, Bureau of Plant Industry, p. 24.

^d La Nature, 1881, pt. 2, p. 115.

^e See especially the Rural New Yorker, January 21, 1854, p. 22.

MAMMOTH.

The Mammoth is at present the most important soy bean grown in the United States. It has also been known as Late, Yellow, Late Yellow, Southern, and Mammoth Yellow.

The date of introduction of this variety is very obscure, and nothing definite is known regarding its origin. None of the numerous recent introductions are identical and but one is closely similar, namely, No. 22318, from Erfurt, Germany, received as "Yellow Riesen." It is not probable, though, that this was German-grown seed, as so late a variety could scarcely mature in Germany. Several varieties from Shanghai, China, and from Japan are closely related. It may possibly be the "white-seeded" soy bean introduced by the Perry expedition. We have been unable to find any early published records that definitely refer to this variety. It is not improbable that it is this variety that was grown at the North Carolina Agricultural Experiment Station in 1882. There can be but little doubt that it is the "soja" bean from T. W. Wood & Sons, Richmond, Va., grown by the Kansas Agricultural Experiment Station in 1889 ^a and in 1890. ^b Since 1895 Mammoth has been a well-known variety.

BUCKSHOT.

The history of this variety is somewhat complicated. It has been obtained from the following American sources:

Agrostology No. 1184, "Black," from Rhode Island Agricultural Experiment Station, spring, 1903.

Agrostology No. 1301, "Early," from Johnson & Stokes, March, 1902.

Agrostology No. 1303, "Extra Early Black," from J. M. Thorburn & Co., March, 1902.

Agrostology No. 1304, from W. A. Burpee, March, 1902.

Agrostology No. 1474, "Extra Early Black," from Hammond Seed Company, March, 1903.

Agrostology No. 2033, "Crossbred No. 9," from the Arkansas Agricultural Experiment Station, May, 1904. "Crossbred No. 9" of Evans is really Ogemaw, while his "Crossbred No. 6" is Early Black or Buckshot. These two numbers were exactly reversed at the Arkansas Experiment Station, as the variety received from that station as "Crossbred No. 6" (Agrostology No. 2031) proved to be Ogemaw.

All of the foregoing were later united as S. P. I. No. 17251.

S. P. I. No. 6334, from Tokyo, Japan, April 20, 1901. Among the progeny of this are S. P. I. Nos. 8491, 9412, and probably 11179, and Agrostology No. 1292.

S. P. I. No. 19987, from Yokohama, Japan, 1907.

S. P. I. No. 22883, from Tokyo, Japan, 1908.

S. P. I. No. 22322, "Early Black from Podolia," Haage & Schmidt, 1908.

^a Report, Kansas Agricultural Experiment Station, 1889, p. 43.

^b Bulletin 19, Kansas Agricultural Experiment Station, p. 201.

From these data it would appear that the Buckshot is a common Japanese variety. But Mr. E. E. Evans, West Branch, Mich., claims that this variety was originated by him in 1901 as a hybrid, "Evans's Crossbred No. 6," which he advertised in 1902 and distributed widely. In recent correspondence Mr. Evans states that this was a hybrid of a large, flat, black variety, Medium Early Black, and of the Dwarf Brown. According to Mr. Ball, No. 6334 and its progeny numbers were identical with Evans's variety. In Mr. H. T. Nielsen's opinion, Nos. 19987 and 22883 were also precisely identical. Unfortunately, these three Japanese lots were not grown in 1909. A critical comparison of the seed samples shows, however, that the three Japanese lots have thicker, more nearly globose seeds than most of the lots derived from Evans's plant. It is, therefore, not unlikely that there are really two closely similar but distinct varieties involved, a matter which needs further investigation.

Nos. 22322 and 25212 A are undoubtedly the same as Evans's plant.

GUELPH, OR MEDIUM GREEN.

Guelph, or Medium Green, was introduced by Prof. W. P. Brooks, in 1889, from Japan, and is now quite extensively grown in the Northern States. The same variety was also obtained from Hankow, China, in May, 1901—S. P. I. No. 6558, according to Ball's identification.^a It has since been received from only one foreign source, namely, S. P. I. No. 22320, from Haage & Schmidt, as "Green Samarow." This last might easily be the progeny of the American introduction.

BUTTERBALL.

The Butterball variety was first secured from the Rhode Island Agricultural Experiment Station in 1903 as "Early Japan," and it is probably one of Professor Brooks's introductions. According to Ball,^b S. P. I. No. 8422, from Yokohama, Japan, is identical. A recent culture of this number obtained after a lapse of several years from the Illinois Agricultural Experiment Station, through Mr. H. B. Derr, proved to be Butterball, but there were a few different things intermixed, probably hybrids. A recent lot of seed from Dammann & Co., Naples, Italy, S. P. I. No. 22415, received as "Giant Yellow," is undoubtedly Butterball.

^a Bulletin 98, Bureau of Plant Industry, p. 21.

^b Bulletin 98, Bureau of Plant Industry, p. 25.

KINGSTON.

The Kingston soy bean was received from the Rhode Island Agricultural Experiment Station in 1903 as "Japanese No. 15." It was obtained by them from Prof. W. P. Brooks, of the Massachusetts Agricultural Experiment Station, who brought a number of soy-bean varieties from Japan in 1889, and is probably the variety which he named "Medium Black." It has never been secured from any other source. In all probability this is the variety grown at the Rhode Island Agricultural Experiment Station in 1893^a as "Medium Black."

SAMAROW.

The Samarow has not occurred in any of our Asiatic importations. It is advertised under the name of "Green Samarow" by several European seedsmen. Messrs. J. M. Thorburn & Co., who first introduced it into the United States about 1901, inform us that their seed was from Italy. The "Green Samarow," S. P. I. No. 22320, from Haage & Schmidt, Erfurt, Germany, proved to be Guelph.

EDA.

The Eda is the brown-seeded variety introduced from Japan and grown by the Kansas Agricultural Experiment Station in 1890 under the name *Yamagata Cha-daidzu*. The identification of Chadaidzu rests on the fact that the Rhode Island Agricultural Experiment Station secured all of the varieties from Kansas in 1892. The Department of Agriculture obtained all of these varieties from Rhode Island in 1903, including but one brown-seeded variety under the name "Brown Eda Mame."

OGEMAW, OR OGEMA.

The Ogemaw, or Ogema, variety was first introduced by Mr. E. E. Evans, of West Branch, Mich., in 1902, as "Evans's Crossbred No. 9." Mr. Evans writes that he originated this as a cross between his No. 6, Early Black, and the Dwarf Brown. All of the several lots of this variety grown in our trials, namely, Agrostology Nos. 13502, 17258, and 17259, trace back to this origin, and it has been obtained from no foreign source. Nos. 21755, from France, and 25212, from Bremen, Germany, are very similar, however.

^a Annual Report, Rhode Island Agricultural Experiment Station, 1893, p. 191.

VARIETIES GROWN IN EUROPE.

EARLY HISTORY.

The growing of soy beans in Europe dates from the experiments of Prof. Friedrich Haberlandt, of Vienna, in 1875 and subsequent years. Haberlandt secured seed of nineteen varieties at the Vienna exposition in 1873. These were as follows:

Five yellow-seeded varieties from China.	One yellow-seeded variety from Japan.
Three black-seeded varieties from China.	Three black-seeded varieties from Japan.
Three green-seeded varieties from China.	One black-seeded variety from Trans-
Two brown-red-seeded varieties from China.	Caucasia.
	One green-seeded variety from Tunis.

Of these, only four varieties matured at Vienna, namely, two yellow seeded, one black seeded, and one brown-red seeded, all from China. All of Haberlandt's further work was done with these four varieties, which were grown in many places in Austria and Germany and in France and Italy, so that they became widespread. Presumably they are still among the varieties grown in Europe. They were brought to this country by Cook and by Neilson in 1878,^a but it is only by surmise that any of the American varieties can be traced to this source.

From various European sources the following varieties of soy beans have been obtained:

SAMAROW.

Seed obtained from Dammann & Co., Naples, Italy, No. 22411, and identical with No. 17260, which last was introduced by Messrs. Thorburn & Co. from Italy. Also called "Green Samarow."

ETAMPES.

Seed from Vilmorin-Andrieux & Co., Paris, France, No. 21818, proved identical with Ito San. Also advertised by other European seedsmen, usually as Yellow Etampes.

CHERNIE.

Seed was received from Vilmorin-Andrieux & Co. as "Early Black from Podolia," No. 21757 and No. 21756; from Haage & Schmidt, Erfurt, Germany, as No. 22321; and from Dammann & Co. as "Black," No. 22412. All of these are identical and indistinguishable from No. 18227, obtained from Khabarovsk, Siberia.

"YELLOW RIESEN."

Seed obtained from Haage & Schmidt, No. 22318. The variety is very similar to Mammoth, but somewhat later. No. 22317, "Yellow," from the same source, has indistinguishable seeds, but these did not germinate.

^a Rural New Yorker, 1882, p. 9.

BUCKSHOT.

No. 22322, obtained from Haage & Schmidt, is indistinguishable from the Buckshot variety, S. P. I. No. 17251. It was received as "Early Black from Podolia," but is not the same as the variety received under that name from another source. Seeds of this variety were also mixed in the brown seed from the Botanical Garden of Bremen, Germany, and grown as No. 25212 A.

"YELLOW."

This variety was received from Dammann & Co., No. 22414, and Vilmorin-Andrieux & Co., No. 21754, the two being identical and different from any others yet received. It is a small, early variety, maturing at Arlington in ninety days.^a

"BROWN."

Seed under this name was obtained from Dammann & Co., No. 22413, Haage & Schmidt, No. 22319, and Vilmorin-Andrieux & Co., No. 21755. These seeds are indistinguishable, but only No. 21755 grew. The original seed of this is much smaller than Ogemaw, but in 1909 both the seeds and plants could not be distinguished from Ogemaw from Michigan. No. 25212, from the Botanical Garden, Bremen, Germany, also with brown seeds, was likewise indistinguishable from Ogemaw in 1909, though the original seeds were different both from No. 21755 and from Ogemaw.

BUTTERBALL.

The variety secured from Dammann & Co., No. 22415, as "Giant Yellow," could not be distinguished from S. P. I. No. 17274, Butterball.

S. P. I. NO. 5039.

This seed was received from Vilmorin-Andrieux & Co. as "Extra Early Black Seeded." This is the original importation of the variety later named Wisconsin Black, S. P. I. No. 25468, which is now commercially handled by a few seedsmen.

There are no authentic records of a few of the earliest S. P. I. importations from Europe, so that nothing definite can be said as to their identity. Among these are No. 1492 (brown seeded), No. 1493 (black seeded), and No. 2156, Yellow Etampes, all from France.

From these data it would appear that at the present time at least ten varieties of soy beans are more or less grown in Europe. Presumably there are included among these the four varieties grown by Haberlandt, and it is therefore probable that his black variety was Chernie, his brown-red variety the "Brown" of the European seedsmen, one of the yellows the Ito San or Etampes, and the other probably the "Yellow" of Dammann & Co. and Vilmorin-Andrieux & Co. All of these are quite small seeded and agree well with the weights per thousand seeds as given by Haberlandt.

^aNo. 17276, without name, from Havre, France, is a very similar but distinct variety.

THE SOY BEAN IN ASIA.

ASIATIC SOURCES OF SOY BEANS.

Soy beans are grown most abundantly in Asia in Japan, Korea, Manchuria, and in the northern provinces of China, namely Shan-si and Shan-tung, but little detailed statistical information concerning the crop has yet been published.^a

In other provinces of China the plant seems not to be cultivated extensively, though grown as far south as the Yangtse. Seeds have also been received from such places as Canton and Hongkong in southern China, but it is not certain that these were grown there. The soy bean is also grown sparingly in Formosa, Cochin China, Celebes, Java, and India.

According to Watt^b the soy bean is "extensively cultivated throughout India and in eastern Bengal, Khasi Hills, Manipur, the Naga Hills, and Burma, often found as a weed on fields or near cultivation." The few varieties secured from India are very distinct, indicating a long culture in that country, as indeed the numerous vernacular names used would imply.

LIST OF VARIETIES.

Among the many varieties introduced it is a very interesting fact that the same variety has rarely been secured a second time unless from the same place. It appears that practically every locality in China has its own local varieties. If this be true, then there are probably several times as many varieties existing as have yet been obtained. In general, the earliest varieties come from the northernmost localities, the latest from the southernmost.

The following lists show the various places in Asia from which soy-bean seed has been obtained. Distinct soy-bean varieties are obtained from practically every different locality. The list not only indicates to some extent the distribution of the soy bean, but will suggest the more likely regions from which valuable new varieties may be obtained.

SIBERIA.

South Usuri, Nos. 480, 20699; Khabarovsk, Nos. 18227, 20405, 20406, 20408; Merkoechofka, Nos. 20407, 20409, 20410, 20411, 10412, 20414.

MANCHURIA.

Newchwang, Nos. 19183, 19184, 19186; Harbin, No. 20854; Tieling, Nos. 21079, 21080.

^a See, however, the following works: Hosie, Alexander, Report on the Province of Szechwan, 1904, and Soya Bean and Products; Special Consular Reports, vol. 40, 1909, Bureau of Manufactures, Department of Commerce and Labor.

^b Dictionary of the Economic Products of India, 1890, vol. 3, p. 510.

KOREA.

Pingyang, Nos. 6386, 6396, 6397, 6414, 6416; Ko-bau, No. 20011.

JAPAN.

Tokyo, Nos. 647, 648, 650, 651, 652, 653, 654, 655, 656, 6312, 6314, 6326, 6333, 6334, 6335, 6336, 22874, 22875, 22876, 22877, 22878, 22879, 22880, 22881, 22882, 22883, 22884, 22885; Kobe, Nos. 20892, 20893; Yokohama, Nos. 4980, 8422, 8423, 8424, 19981, 19982, 19983, 19984, 19985, 19986, 19987, 22503, 22504, 22505, 22506, 22507; Hokkaido, Nos. 21825, 21830, 21831; Anjo, No. 8900.

CHINA.

Peking, Chihli, Nos. 17852, 23305, 23306, 27498; Shan-hai-kwan, Chihli, No. 17857; Tientsin, Chihli, Nos. 17862, 23229; Paotingfu, Chihli, Nos. 22897, 22899, 22900, 22901, 23312; Wutaishan, Chihli, Nos. 23291, 23292; Shiling, Chihli, Nos. 23303, 23311; Pee-san, Chihli, No. 18258; Tschang-ping-tsu, Chihli, No. 18259; Sachon, Chihli, No. 17861; Chefoo, Shantung, Nos. 22536, 22537, 22538; Boshan, Shantung, No. 21999; Chungking, Szechwan, Nos. 23522, 23523; Ningyuenfu, Szechwan, Nos. 23544, 23545, 23646; Yachow, Szechwan, Nos. 25437, 25438; Soochow, Kiangsu, Nos. 23207, 24180, 24181, 24182, 24183, 24184, 25133, 25134, 25135, 25136, 25137, 25138; Shanghai, Kiangsu, Nos. 14952, 14953, 14954, 18619, 22311, 22312, 22927, 23205, 23336, 23337, 23338; Chinhua, near Shanghai, Nos. 20797, 20798, 23232; Chin-kiang, Kiangsu, Nos. 8584, 8586; Chinhua, Kiangsu, No. 9344; Tangsi, Chekiang, Nos. 23208, 23209, 23211; Taichow, Chekiang, Nos. 23296, 23297; Hangchow, Chekiang, Nos. 16789, 16790, 22498, 22499, 22500, 22501, 22644, 22645, 22646, 23212, 23213; Hankow, Hupeh, Nos. 6556, 6558, 6559, 6560, 6561; Wuchang, Hupeh, Nos. 2869, 2870, 2871, 2872; Ingchung, Fukien, Nos. 22920, 22921, 22922; Ingang, Fukien, No. 27499; Swatow, Kwangtung, No. 22886; Canton, Kwangtung, Nos. 22379, 22380, 23325, 23326, 23327; Hongkong, Kwangtung, Nos. 22406, 22407; Sheklung, Kwangtung, Nos. 22633, 22634; Tsintse, Anhwei, No. 23299; Weihsien, Shantung, Nos. 22534, 22535.

FORMOSA.

Taihoku, Nos. 24641, 24642, 24643.

COCHIN CHINA.

Saigon, No. 22714.

INDIA.

Darjiling, Assam, Nos. 24673, 24674; Pithoragarh, Kumaon District, No. 25118; Khasi Hills, Assam, No. 24672; Safipur, Unao, U. P., No. 24675; Hasangani, Unao, U. P., No. 24676; Ranjitpurwa, Unao, U. P., No. 24677; Etawah, U. P., Nos. 24678, 24679, 24680, 24683, 24684, 24685, 24686; Mainpuri, U. P., Nos. 24681, 24682; United Provinces, No. 24687; Cawnpore, U. P., Nos. 24688, 24689; Dehra Dun, U. P., No. 24690; Poona, Bombay, but grown there from Japanese seed, Nos. 24693, 24694, 24695, 24696, 24697, 24698, 24699, 24700, 24701, 24702, 24703, 24704, 24705, 24706, 24707, 24708, 24709, 24710, 24711.

JAVA.

Buitenzorg, No. 21946.

CELEBES.

Macassar, Celebes, No. 5517.

DESIRABLE CHARACTERS IN SOY-BEAN VARIETIES.

CONSIDERATIONS GOVERNING CHOICE.

The determination of the best variety of soy bean for any locality will depend first on whether it is grown primarily for hay or for grain, or for both purposes. In this, as with other crops, yield is the most valuable single desideratum. Secondary considerations of importance are habit of the plant, degree of coarseness, ability to retain the foliage, color of seed, and ease of shattering.

HABIT OF THE PLANT.

Erectness of stem with upright or ascending branches is a prime requisite of a desirable variety. A tall habit is also important, as dwarf varieties usually bear pods very close to the ground, so that many will be left on the stubble, which is not the case in many tall sorts.

COARSENESS.

An objection to some varieties of soy beans is the coarse, woody stem which makes mowing difficult. There are many slender varieties where this objection does not hold, but slenderness is usually accompanied with small pods and seeds, and often with vining tips and a tendency to lodge. Unless there is lodging, such varieties are easily mown.

ABILITY TO RETAIN LEAVES.

Nearly all soy beans begin to shed their leaves as the pods ripen. There are a number of exceptions to this, like the Wisconsin Black, where the leaves remain green even after all the pods are mature. It may be possible to combine this character as a valuable feature to later varieties to be grown both for hay and grain.

COLOR OF THE SEED.

Yellow or green seeds are preferable to darker colors, as the shattered seeds are more easily found by hogs pasturing the field or stubble.

SHATTERING.

When grown for grain alone, shattering is a serious fault. Some varieties, like Guelph, shatter inordinately; others, like Peking, scarcely at all; while most varieties shatter somewhat, especially during changeable weather, if not harvested when ripe. As a rule the varieties with large pods and seeds shatter much worse than those with small pods and seeds. In a few varieties, like Brownie, the seed coats break badly in thrashing, a very objectionable character.

RESISTANCE TO DISEASE.

In sections where nematodes and cowpea wilt occur most soy-bean varieties are seriously affected by both these diseases. A few varieties, however, exhibit considerable resistance to these diseases, and there is good ground to believe that practically immune strains can be developed.

NONFILLING OF PODS.

In Louisiana and the southern half of Alabama, Mississippi, and Georgia late varieties of soy beans, especially the Mammoth, frequently fail to develop seeds; while earlier sorts are not thus affected. The cause for this has not been determined. At Biloxi, Miss., selections of No. 20797 fill their pods perfectly, so that there is little doubt that late varieties adapted to this section can be secured or developed.

SYNOPSIS OF THE GROUPS.

Plants bushy, the branches without tendency to twine, the terminals rarely elongated:

Pods medium to large, crowded or scattered; stems coarse to medium. GROUP I
Pods small, stem rather slender—

Internodes short, the pods crowded; medium late..... II

Internodes long, the pods scattered; very late; foliage dark green. III

Plants more or less twining, especially the long, slender terminals:

Plants erect or suberect, slender, the internodes long; pods medium to small..... IV

Plants procumbent, rather coarse; pods small; very late..... V

These groups merge into each other more or less, but in a general way represent fairly distinct types. The type of branching is the same in all, the differences being due to the relative development of the main stem and the lateral branches.

SYNOPSIS OF THE VARIETIES.

GROUP I.—190 VARIETIES.

Group I contains far more than half of the varieties of soy beans, including all the best known ones, such as Mammoth, Hollybrook, Guelph, and Ito San.

Seeds straw-yellow; germ yellow—71 varieties.—Nos. 14953, 14953 A, 14953 B, 16790 D, 17257 E, 17262 B, 17268, 17268 A, 17269, 17269 D, 17270, 17271, 17273, 17275, 17275 L, 17276, 17277, 17277 A, 17278, 17280, 17862 G, 18619, 19184 A, 19184 G, 19981, 19981 A, 19984, 20011 A, 20406, 20406 C, 20407 B, 20892, 20892 A, 20893 A, 21079 H, 21080 K, 21754, 21825, 22312, 22318, 22318 A, 22335, 22379, 22406, 22498, 22503, 22504 A, 22505, 22506, 22714, 22876, 22879, 22880, 22880 A, 22880 C, 22901, 22921 B, 22922, 22922 A, 23207 B, 23209, 23292, 23296, 23303, 24181, 24672, 24672 B, 24695, 24840, 25131, 27500.

Seeds olive-yellow; germ yellow—45 varieties.—Nos. 17251 A, 17253 C, 17254 C, 17262, 17263, 17263 D, 17264, 17267, 17268 C, 17271 E, 17275 B, 17862 E, 19184 D, 19184 E, 19186, 19981 B, 19984 D, 19985, 19985 F, 19985 K, 19986, 20011, 20405, 20405 C, 20406 E, 20798 C, 21079, 21079 D, 22381, 22381 B, 22504, 22507, 22537, 22644, 22644 B, 22644 C, 22645, 22646, 22874, 22898 A, 22920, 23207, 24183, 24839, 27501.

Seeds chromium green; germ green—17 varieties.—Nos. 17260, 17261, 17271 L, 17852 N, 17862 B, 18258 E, 20854, 21080, 21080 N, 22500, 22880 B, 22897, 23209 A, 23292 C, 23296 A, 23303 A, 25437 A.

Seeds brown to olive; germ yellow—28 varieties.—Nos. 17254 B, 17256, 17257, 17257 D, 17257 G, 17258, 17258 A, 17260 B, 17263 C, 17277 C, 17277 D, 18258 N, 19186 C, 19984 A, 19984 B, 20405 B, 20406 G, 20412 A, 20412 B, 21080 L, 21755, 22333, 22411 A, 22644 A, 23229, 24610, 25130, 25437 C.

Seeds black; germ yellow—18 varieties.—Nos. 17251, 17252, 17252 C, 17253, 17254, 17262 D, 17271 D, 20410, 22634, 23205, 23292 A, 23296 C, 23325, 23523, 23546, 24180, 24682, 25468.

Seeds black; germ green—7 varieties.—Nos. 14952, 17255, 19184, 21079 A, 22336 A, 23306, 25437 B.

Seeds bicolored; germ yellow—4 varieties.—Nos. 20407, 20411, 23213 A, 23311 B.

GROUP II.—4 VARIETIES.

Group II consists of four varieties which appear very promising as grain producers. The small size of the seeds is not objectionable, but on the contrary advantageous when grown for grain alone.

Seeds olive-yellow; germ yellow—2 varieties.—Nos. 17852 E, 23312.

Seeds black; germ yellow—2 varieties.—Nos. 17852 B, 23311 A.

GROUP III.—3 VARIETIES.

The four or five varieties belonging to Group III have a very different appearance from other soy beans. They all come from the valley of the Yangtse, and are said to be grown on the low-lying rice fields either as a green manure or for fodder. Their marked leafiness, large size, and slender stems make them especially desirable for hay. They are too late to mature at Washington.

Seeds brown to olive; germ yellow—5 varieties.—Nos. 9344, 20798, 23336.

Seeds black; germ yellow—3 varieties.—Nos. 6560, 20797, 23337.

Seeds bicolored; germ yellow—2 varieties.—Nos. 6559, 23338.

GROUP IV.—76 VARIETIES.

Group IV is the second largest group and includes the most important Manchurian varieties. From the standpoint of seed production, they promise to be superior to Group I because of their relatively slender stems, permitting easy mowing, and their smaller pods and seeds, which shatter less easily. They can also be planted more closely because they are less bushy.

Seeds straw-yellow; germ yellow—25 varieties.—Nos. 14954, 16789, 16789 A, 16789 B, 17272, 17277 E, 17862, 17862 C, 17862 F, 18258, 18258 A, 19186 F, 22534, 22921, 22921 A, 23208, 23213, 23297 B, 24184, 25133, 25134, 25134 A, 25437, 25438 B, 27499.

Seeds olive-yellow; germ yellow—8 varieties.—Nos. 17857 B, 19183 B, 19184 C, 20798 E, 21999 C, 21999 D, 22633, 22920 A.

Seeds chromium green; germ green—7 varieties.—Nos. 17857, 18258 D, 23311, 25135, 25438, 25438 A, 27498.

Seeds brown to olive; germ yellow—12 varieties.—Nos. 17852 C, 19186 D, 20409, 20412, 21999 B, 23211, 23232, 23292 B, 23297 A, 23299, 24672 A, 25136.

Seeds black; germ yellow—16 varieties.—Nos. 16790, 16790 B, 17852 D, 17852 R, 17861, 18227, 18259, 19183, 19186 B, 22538, 22899, 22899 A, 22919, 23291, 23297, 23338 B.

Seeds black; germ green—5 varieties.—Nos. 22380, 22407, 22501, 22900, 22927.

Seeds bicolored; germ yellow—3 varieties.—Nos. 17852, 21999, 23299.

GROUP V.—7 VARIETIES.

The varieties included in Group V are mostly from India, but the wild soy bean of China and Japan is also included. All form tangled masses of vines, difficult to mow, but perhaps of use as green manure and pasture crops.

Seeds straw-yellow; germ yellow—1 variety.—No. 24674.

Seeds brown to olive; germ yellow—1 variety.—No. 24673.

Seeds shining black; germ yellow—3 varieties.—Nos. 24642, 24675, 25137.

Seeds dull black, very small; germ yellow—1 variety.—No. 22428.

Seeds bicolored; germ yellow—1 variety.—No. 25118.

CATALOGUE OF SOY-BEAN VARIETIES.

The following is a complete list of soy beans imported by the United States Department of Agriculture, arranged chronologically in accordance with the serial numbers (S. P. I. numbers) assigned to them by the Office of Foreign Seed and Plant Introduction:

- 480. From South Usuri, Siberia, 1898. Seeds yellow. Insufficient varietal notes.
- 647. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 648. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 649. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 650. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 651. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 652. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 653. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 654. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 655. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 656. From Tokyo, Japan, 1898. Insufficient varietal notes.
- 1492. From France, 1898. Seed brown. Insufficient varietal notes.
- 1493. From France, 1898. Seed black. Insufficient varietal notes.
- 2156. From France, 1898. "Yellow Etampes." See 17268.
- 2869. From Wuchang, Hupeh, China, 1899. Seeds yellow. Insufficient varietal notes.
- 2870. From Wuchang, Hupeh, China, 1899. Seeds green. Insufficient varietal notes.
- 2871. From Wuchang, Hupeh, China, 1899. Seeds green. Insufficient varietal notes.
- 2872. From Wuchang, Hupeh, China, 1899. Seeds green. Insufficient varietal notes.

3869. From China, 1899. Insufficient varietal notes.
 3870. From China, 1899. See 17272.
 3884. From Honolulu, 1899. Seeds yellow. Insufficient varietal notes.
 3885. From Honolulu, 1899. Seeds black. Insufficient varietal notes.
 3886. From Honolulu, 1899. Seeds green. Insufficient varietal notes.
 4285. From Richmond, Va., 1900. "Mammoth." See 17280.
 4628. From Amherst, Mass., 1900. "Medium Green." See 17261.
 4912. From Japan. See 17270.
 4913. From Japan. See 12400.
 4914. From Japan. See 17266.
 4980. From Yokohama, Japan. Insufficient varietal notes.
 5039. From Paris, France. See 25468.
 5517. From Macassar, Celebes. Insufficient varietal notes.
 5764. Grown from 4912. See 17270.
 5765. Grown from 4913. See 12400.
 5766. Grown from 4914. See 17266.
 6312. From Tokyo, Japan, 1901. See 17252.
 6314. From Tokyo, Japan, 1901. See 17262.
 6326. From Tokyo, Japan, 1901. See 17268.
 6333. From Tokyo, Japan, 1901. See 17277.
 6334. From Tokyo, Japan, 1901. See 9412.
 6335. From Tokyo, Japan, 1901. See 17267.
 6336. From Tokyo, Japan, 1901. See 9413.
 6379. Grown from 3870. See 17272.
 6386. From Pingyang, Korea, 1901. See 17254.
 6396. From Pingyang, Korea, 1901. See 17271.
 6397. From Pingyang, Korea, 1901. See 17263.
 6414. From Pingyang, Korea, 1901. See 17256 and 22333.
 6416. From Pingyang, Korea, 1901. See 17253.
 6556. From central China. See 17269.
 6558. From Hankow, Hupeh, China. See 17261.
 6559. *Hankow*. From near Hankow, Hupeh, China, 1901. Plants slender, erect, very leafy; height 36 to 42 inches; very late; pubescence tawny; flowers purple; pods scattered; seeds brown, more or less banded with black, medium small, oblong, flattened; hilum brown; germ yellow. This variety is almost identical with the following, except for the color of the seed.
 6560. *Riceland*. From near Hankow, Hupeh, China. Plants slender, erect, very leafy; height 36 to 60 inches; very late; pubescence tawny; flowers purple; pods scattered; seeds black, oblong, small, flattened; hilum pale; germ yellow. This is very similar to 20797, but has smaller seeds. The stock has been lost.
 6561. From near Hankow, Hupeh, China. Seeds small, black, short, oblong; medium small; hilum pale; germ yellow. Apparently it was never grown.
 8422. From Yokohama, Japan. See 17274.
 8423. From Yokohama, Japan. See 17265.
 8424. From Yokohama, Japan. See 17264.
 8489. Grown from 6314. See 17262.
 8490. Grown from 6333. See 17277.
 8491. Grown from 6334. See 9412.
 8492. Grown from 6386. See 17254.
 8493. Grown from 6396. See 17271.
 8494. Grown from 6336. See 9413.

8495. Grown from 6397. See 17263.
 8496. Grown from 6416. See 17253.
 8497. Grown from 6312. See 17252.
 8584. From Chin-kiang, Kiangsu, China. Insufficient varietal notes.
 8586. From Chin-kiang, Kiangsu, China. Insufficient varietal notes.
 8900. From Anjo, Japan. Insufficient varietal notes.
 9344. From Chin-hua, Kiangsu, China. The seed of this did not germinate. It is almost certainly the same as No. 23336.
 9407. Grown from 4912. See 17270.
 9408. Grown from 4913. See 12400.
 9409. Grown from 4914. See 17266.
 9410. Grown from 6312. See 17252.
 9411. Grown from 6333. See 17277.
 9412. Grown from 6334. According to Ball, indistinguishable from several other lots, all of which were united as 17251, which see.
 9413. Grown from 6336. According to Ball, identical with 12400, the two being united as No. 17275, which see.
 9414. Grown from 6386. See 17254.
 9415. Grown from 6396. See 17271.
 9416. Grown from 6397. See 17263.
 9417. Grown from 6414. See 17256.
 9417 A. Grown from 6414. See 22333.
 9418. Grown from 6416. See 17253.
 11179. Origin lost. Same as 17251.
 11180. Origin lost. Insufficient varietal notes.
 12399. Grown from 9407. See 17270.
 12400. Grown from 9408. According to Ball, this proved identical with 9413, the seed of these two numbers being united as No. 17275, which see.
 13502. *Ogemaw*. From West Branch, Mich. See 17258.
 13503. *Guelph*. Grown at Arlington Experimental Farm from seed from Thorburn & Co. See 17261.
 14952. *Shanghai*. From Shanghai, China, 1905. Erect, stout, bushy; height 30 to 36 inches; late; pubescence tawny; flowers both purple and white; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, tumid, scattered, shattering little; seeds black, large, 8 to $8\frac{1}{2}$ mm. long, elliptical; hilum pale; germ green. Grown five seasons. No. 22311, also from Shanghai, proved to be the same.
 14953. *Edward*. From Shanghai, China, 1905. Plants stout, erect, bushy; height 36 to 42 inches; very late; pubescence gray; flowers purple; pods large, 2 to $2\frac{1}{2}$ inches, compressed, scattered, shattering little; seeds straw-yellow, large, 8 to 9 mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown five seasons.
 14953 A. A field selection in 1907. Plants stout, erect, bushy; height 30 to 36 inches; late; pubescence tawny; flowers purple; pods large, 2 to $2\frac{1}{2}$ inches long, compressed, half crowded, shattering little; seeds straw-yellow, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum seal-brown; germ yellow. Grown two seasons.
 14953 B. A field selection in 1907. Plants stout, erect, bushy; height 30 to 40 inches; very late; pubescence gray; flowers purple; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, tumid, scattered, shattering little; seeds straw-yellow, large, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum seal-brown; germ yellow. Grown two seasons.

14954. *Acme*. From Shanghai, China, 1905. Plants slender, erect, the tips twining; height 36 to 42 inches; late; pubescence gray (50 per cent) and tawny (50 per cent); flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds straw-yellow, small, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum seal-brown; germ yellow. Grown five seasons.
15887. From Chekiang Province, China. Indistinguishable from Riceland, 20797. Grown in 1907.
16789. *Brooks*. From Hangchow, Chekiang, China, 1905. Plants slender, erect, the tips twining; height 36 to 42 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, scattered, shattering little; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum light to dark brown; germ yellow. Grown four seasons. This is said to be the bean-cake bean grown so extensively in the Manchurian provinces and is a most valuable crop.
- 16789 A. *Flava*. A field mass selection in 1907. Plants slender, erect, the tips twining; height 28 to 34 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, half crowded, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
- 16789 B. A field mass selection in 1907. Plants slender, erect, the tips twining; height 36 to 42 inches; late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, scattered, shattering little; seeds straw-yellow, medium large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light; germ yellow. Grown two seasons.
16790. *Cloud*. From Hangchow, Chekiang, China, 1905. Plants slender, erect, the tips twining; height 34 to 40 inches; medium late; pubescence both gray and tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds black, medium small, 7 to $7\frac{1}{2}$ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown four seasons. This variety is said to be an excellent table bean. No. 22535, from Weih sien, China, is the same thing.
- 16790 B. A field mass selection in 1907. Plants erect, the tips twining; height 48 to 52 inches; medium late; pubescence gray (10 per cent) and tawny (90 per cent); flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds dull black, medium-sized, 8 to $8\frac{1}{2}$ mm. long, oblong, much flattened; hilum seal-brown; germ yellow. Grown two seasons.
- 16790 D. A pure field selection in 1907. Plants erect, stout, bushy; height 20 to 24 inches; medium late; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering little; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
17251. *Buckshot*. Plants stout, erect, bushy; height 14 to 18 inches; early; pubescence tawny; flowers white; pods medium to large, $1\frac{1}{2}$ to 2 inches long, crowded, shattering little; seeds black, large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown eight seasons. Buckshot has been on the market for a number of years and sold as Black, Early Black, Medium Early Black, Extra Early Black, Large Black, etc. No. 17251 is composed of the progeny of 6334 combined with various other lots. See page 29. Nos. 19987 and 22883 from Japan are very closely similar, if not identical.

- 17251 A. A pure field selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium; pubescence tawny; flowers purple; pods large, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds olive-yellow, medium large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum black; germ yellow. Grown two seasons.
17252. *Flat King*. The progeny of 6312 from Tokyo, Japan, 1901. Plants stout, erect, bushy; height 24 to 30 inches; late; pubescence tawny; flowers white; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, compressed, half crowded, shattering little; seeds black, large, 11 to $11\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown nine seasons. This variety was also obtained from Yokohama, Japan, No. 19982, and again from Tokyo, No. 22875.
- 17252 C. A field mass selection in 1907. Plants stout, erect, bushy; height 30 to 36 inches; late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds black, medium small, 6 to $6\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
17253. *Nuttall*. The progeny of 6416 from Pingyang, Korea, 1901. Plants stout, erect, bushy; height 18 to 24 inches; medium; pubescence tawny; flowers white; pods medium large, $1\frac{3}{4}$ to $2\frac{1}{4}$ inches long, crowded, shattering little; seeds black, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown nine seasons. No. 22334 is undoubtedly the progeny of 17253 as shown by records.
- 17253 C. A field mass selection in 1907. Plants stout, erect, bushy; height 12 to 16 inches; medium late; pubescence tawny; flowers both purple and white; pods medium large, 2 to $2\frac{1}{2}$ inches long, tumid, half crowded, shattering moderately; seeds olive-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oval; hilum black; germ yellow. Grown two seasons.
17254. *Ebony*. The progeny of 6386 from Pingyang, Korea, 1901. Plants stout, erect, bushy; height 22 to 26 inches; medium late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, half crowded, shattering moderately; seeds black, medium small, 7 to $7\frac{1}{2}$ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown nine seasons. This variety was also received from Swatow, China, 1908 (S. P. I. No. 22886). Ebony has proved a valuable variety in southern Illinois and especially through the work of Mr. Ralph Allen, of Delavan, Ill., has become well known as No. 9414 and also as "Black Beauty."
- 17254 B. A pure field selection in 1907. Plants stout, erect, bushy; height 32 to 36 inches; medium late; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, tumid, half crowded, shattering little; seeds cinnamon brown, small, $5\frac{1}{2}$ to 6 mm. long, subglobose; hilum pale; germ yellow. Grown two seasons.
- 17254 C. A pure field selection in 1907. Plants stout, erect, bushy; height 20 to 26 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering moderately; seeds olive-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum clove-brown; germ yellow. Grown two seasons.
17255. *Kingston*. "Japanese Number 15" from Rhode Island Agricultural Experiment Station, originally from Japan. Plants stout, bushy, erect; height 16 to 22 inches; medium late; pubescence tawny; flowers white; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, tumid, crowded, shattering little; seeds black, small, $5\frac{1}{2}$ to 6 mm. long, subglobose; hilum pale; germ green. Grown nine seasons. See also page 31.

17256. *Brownie*. The progeny of 6414 from Pingyang, Korea, 1901. Plants stout, erect, bushy; height 20 to 30 inches; medium late; pubescence gray; flowers purple; pods small, $1\frac{1}{8}$ to $1\frac{1}{2}$ inches long, tumid, crowded, shattering little; seeds cinnamon brown, small, 5 to $5\frac{1}{2}$ mm. long, subglobose; hilum pale; germ yellow. Grown nine seasons.
- 17256 A. *Baird*. See 22333.
17257. *Eda*. From Rhode Island Agricultural Experiment Station, 1903, but originally introduced by the Kansas Agricultural Experiment Station in 1890 as *Yamagata Cha-daidzu*. Plants stout, erect, bushy; height 14 to 20 inches; medium; pubescence tawny; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds deep brown, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown nine seasons. See also page 31.
- 17257 D. A field mass selection in 1907. Plants stout, erect, bushy; height 20 to 26 inches; medium; pubescence tawny; flowers both purple and white; pods medium small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, tumid, half crowded, shattering moderately; seeds seal-brown, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
- 17257 E. A field mass selection in 1907. Plants stout, erect, bushy; height 18 to 22 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum dark brown; germ yellow. Grown two seasons.
- 17257 G. A field mass selection in 1907. Plants stout, erect, bushy; height 20 to 26 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds buff, medium-sized, 6 to $6\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
17258. *Ogemaw*. The progeny of 13502 from E. E. Evans, West Branch, Mich., 1904. Plants stout, erect, bushy; height 18 to 22 inches; medium; pubescence tawny; flowers white; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, crowded, shattering badly; seeds deep brown, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Compare also page 31 and see notes under Nos. 21755 and 25212.
- 17258 A. A pure field selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium early; pubescence gray; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds buff-brown, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
17260. *Samarow*. From J. M. Thorburn & Co., 1902. Plants stout, erect, bushy; height 15 to 18 inches; medium; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds chromium green, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum brown; germ green. Grown nine seasons. This variety has not occurred in any of our Asiatic importations. It is advertised under the same name by German and Italian seedsmen, and such an importation, No. 22411, from Italy, proved identical with 17260. See also page 31.

- 17260 B. A pure field selection in 1907. Plants stout, erect, bushy; height 14 to 18 inches; medium; pubescence gray; flowers purple; pods medium large, $2\frac{1}{8}$ to $2\frac{1}{4}$ inches long, compressed, crowded, shattering moderately; seeds clove brown to almost black, medium-sized, 9 to $9\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
17261. *Guelph*. From J. M. Thorburn & Co., 1902. Plants stout, erect, bushy; height 20 to 24 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering much; seeds chromium green, medium to medium large, 7 to 8 mm. long, elliptical, slightly flattened; hilum brown; germ green. Grown eight seasons. This variety is advertised by a German seedsman, and such an importation, No. 22320, proved identical with 17261. According to Ball, No 6558 from Hankow, China, is the same as Guelph. Compare page 30.
17262. *Yosho*. The progeny of 6314 from Tokyo, Japan, 1901. Plants stout, erect, bushy; height 22 to 26 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds olive-yellow, large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum black; germ yellow. Grown nine seasons.
- 17262 B. A pure field selection in 1907. Plants stout, erect, bushy; height 10 to 14 inches; medium early; pubescence tawny; flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.
- 17262 D. A field mass selection in 1907. Plants stout, erect, bushy; height 18 to 24 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds black, medium large, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
17263. *Austin*. The progeny of 6397 from Pingyang, Korea, 1901. Plants stout, erect, bushy; height 32 to 36 inches; late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds olive-yellow, medium large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown nine seasons. This variety was also distributed under Agrostology No. 1539.
- 17263 C. A field mass selection in 1907. Plants stout, erect, bushy; height 30 to 34 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds buff, medium small, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
17264. *Tokyo*. The progeny of 8424 from Tokyo, Japan, 1901. Plants stout, erect, bushy; height 30 to 36 inches; late; pubescence gray; flowers both purple and white; pods medium large, $1\frac{1}{2}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds olive-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown nine seasons. This variety was also obtained from Kobe, Japan, No. 20893.
17265. The progeny of 8423 from Yokohama, Japan, 1902. According to Ball this proved the same as the preceding and was united with it.
17266. The progeny of 4914 from Japan. According to Ball this also was the same as Tokyo 17264 and was finally united with it.

17267. *Hope*. The progeny of 6335 from Tokyo, Japan, 1901. Plants stout, erect, bushy; height 28 to 34 inches; late; pubescence gray; flowers both purple and white; pods medium large, $1\frac{3}{4}$ to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering little; seeds olive-yellow, large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown nine seasons. No. 22881, also from Tokyo, is the same variety.

17268. *Ito San*. Plants stout, erect, bushy; height 18 to 22 inches; medium in maturity; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum pale, a brown speck at the micropylar end; germ yellow. Grown nine seasons.

This variety has also been known as "Japan Pea," "Coffee Berry," "Early Yellow," "Early White," and "Yellow Eda Mame." It is one of the earliest importations, very probably 1850, as the "Japan Pea." The Kansas Agricultural Experiment Station obtained this variety from Japan in 1890. Only one European importation has been made, this being from Vilmorin-Andrieux & Co., No. 21818, who advertise the variety as "Yellow Etampes." See also page 28.

17268 A. A field mass selection in 1907. Plants stout, erect, bushy; height 18 to 24 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons.

17268 C. A field mass selection in 1907. Plants stout, erect, bushy; height 20 to 26 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering little; seeds olive-yellow, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, much flattened; hilum seal-brown; germ yellow. Grown two seasons.

17269. *Medium Yellow*. The progeny of 6556 from central China, 1901. Plants stout, erect, bushy; height 30 to 36 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown nine seasons. This is the variety grown as Medium Yellow by the Tennessee Agricultural Experiment Station.

17269 D. A field mass selection in 1907. Plants stout, erect, bushy; height 24 to 30 inches; late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, crowded, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.

17270 The progeny of 4912 from Japan in 1900. Other numbers of the same progeny are 12399, 9407, and 5764. Plants stout, erect, bushy; height 24 to 30 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light to seal brown; germ yellow. Grown nine seasons.

17271. *Haberlandt*. The progeny of 6396 from Pingyang, Korea, 1901. Plants stout, erect, bushy; height 24 to 30 inches; medium late; pubescence tawny; flowers both purple and white; pods crowded, medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown nine seasons.
- 17271 D. A pure field selection in 1907. Plants stout, erect, bushy; height 18 to 24 inches; medium late; pubescence tawny; flowers white; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds black, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
- 17271 L. A pure field selection in 1908. Plants stout, erect, bushy; height 16 to 20 inches; medium early; pubescence tawny; flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds chromium green, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum black; germ green. Grown one season.
17272. The progeny of 3870 from China in 1899. Plants slender, erect, the tips twining; height 32 to 36 inches; medium late; pubescence gray; flowers white; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown ten seasons. Ball included this variety in Hollybrook, but it is different.
17273. *Butterball*. From the Rhode Island Agricultural Experiment Station, 1903, originally from Japan. Plants stout, erect, bushy; height 18 to 24 inches; medium; pubescence gray; flowers white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown seven seasons. This variety has also been obtained from the following foreign sources: Dammann & Co., Naples, Italy, No. 22415; Tokyo, Japan, Nos. 22878 and 22884; and Yokohama, Japan, No. 8422. See also page 30.
17274. The progeny of 8422 from Yokohama, Japan. Identical with 17273.
17275. *Amherst*. The united progenies of 4913 from Japan, 1900, and 6336 from Tokyo, Japan, 1901. Plants stout, erect, bushy; height 24 to 28 inches; medium late; pubescence tawny; flowers purple; pods medium-sized, 1 to $1\frac{1}{4}$ inches long, tumid, crowded, shattering moderately; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum dark brown; germ yellow. Grown nine seasons.
- 17275 B. A field mass selection in 1907. Plants stout, erect, bushy; height, 14 to 18 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering much; seeds olive-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.
- 17275 L. A field mass selection in 1908. Plants stout, erect, bushy; height, 14 to 18 inches; medium early; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, crowded, shattering moderately; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown one season.
17276. The progeny of Agrostology No. 1299 from Havre, France. Plants stout, erect, bushy; height, 14 to 18 inches; early; pubescence gray; flowers white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, half crowded and shattering little; seeds straw-yellow, medium small, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum light to seal-brown; germ yellow. Grown eight seasons.

17277. *Manhattan*. The progeny of 6333 from Tokyo, Japan. Plants stout, erect, bushy; height, 14 to 18 inches; medium early; pubescence gray; flowers white; pods medium large, $1\frac{3}{4}$ to 2 inches long, tumid, crowded, shattering little; seeds straw-yellow, medium large, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum light brown; germ yellow. Grown ten seasons.
- 17277 A. A pure field selection in 1907. Plants stout, erect, bushy; height, 22 to 26 inches; medium late; pubescence tawny; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, crowded, shattering little; seeds straw-yellow, medium large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum seal-brown; germ yellow. Grown two seasons.
- 17277 C. A pure field selection in 1907. Plants stout, erect, bushy; height 16 to 20 inches; early; pubescence tawny; flowers purple; pods, large, $1\frac{3}{4}$ to 2 inches long, compressed, half crowded, shattering little; seeds raw umber, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, much flattened, hilum pale; germ yellow. Grown two seasons.
- 17277 D. A pure field selection in 1907. Plants stout, erect, bushy; height 14 to 20 inches; medium; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, half crowded, shattering little; seeds cinnamon brown, medium-sized, $8\frac{1}{2}$ to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
- 17277 E. A pure field selection in 1907. Plants slender, erect, the tips vining; height 24 to 28 inches; medium; pubescence gray; flowers white; pods medium small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium small, 6 to $6\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.
17278. *Hollybrook*. From Arkansas Agricultural Experiment Station, 1904. Plants stout, erect, bushy; height 24 to 30 inches; late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering little; seeds straw-yellow, small to medium, $5\frac{1}{2}$ to $6\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown six seasons. This variety was introduced by Messrs. T. W. Wood & Sons, of Richmond, Va., originally found mixed in Mammoth. Nos. 17269, 17270, 17272, and 17276 are all distinct.
17280. *Mammoth*. A combination of various lots; all from American sources. Plants stout, erect, bushy; height 36 to 42 inches; late; pubescence gray; flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, scattered, shattering little; seeds straw-yellow, medium small, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown ten seasons. This variety has also been grown under Nos. 4285, 25093, and 25162. It is the standard commercial late variety, more extensively grown at present than any other. See also page 29.
17520. *Hollybrook*. From Wood & Sons, Richmond, Va. Same as 17278.
17852. *Meyer*. From Peking, Chihli, China, 1906. Plants slender, erect, the tips twining; height 32 to 38 inches; late; pubescence tawny; flowers purple; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, scattered, shattering little; seeds variable, black and brown, the colors usually in concentric bands, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown four seasons. The beans of this variety are said to be roasted and sold in Peking as delicatessen.
- 17852 B. *Peking*. A pure field selection in 1907. Plants slender, erect; height 32 to 36 inches; medium late; pubescence tawny; flowers white; pods small, $1\frac{3}{4}$ to 2 inches long, compressed, shattering little; seeds black, medium small, 7 to $7\frac{1}{2}$ mm. long, oblong or nearly so, much flattened; hilum pale; germ yellow. Grown two seasons.

- 17852 C. A field mass selection in 1907. Plants slender, erect, the tips twining; height 24 to 30 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering moderately; seeds olive-brown, medium-sized, 8 to $8\frac{1}{2}$ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons.
- 17852 D. A pure field selection in 1907. Plants slender, suberect, the tips twining; stems 42 to 52 inches; medium late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds black, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
- 17852 E. A field mass selection in 1907. Plants slender, erect; height 24 to 30 inches; medium late; pubescence gray; flowers both purple and white; pods small, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, tumid, shattering little; seeds olive-yellow, medium small, $6\frac{1}{2}$ to 7 mm. long, elliptical, much flattened; hilum light brown; germ yellow. Grown two seasons.
- 17852 N. A field mass selection in 1907. Plants stout, erect, bushy; height 18 to 30 inches; medium late; pubescence tawny; flowers purple; pods large, 2 to $2\frac{1}{4}$ inches long, compressed, half crowded, shattering much; seeds chromium green, large, $9\frac{1}{2}$ to $10\frac{1}{2}$ mm. long, broadly elliptical, much flattened; hilum slate-black; germ green. Grown two seasons. Except for color of seed this is identical with 17252, Flat King.
- 17852 R. A field mass selection in 1907. Plants slender, suberect, the tips twining; stems 48 to 56 inches; medium late; pubescence gray (10 per cent) and tawny (90 per cent); flowers both purple and white; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering moderately; seeds medium-sized, $6\frac{1}{2}$ to 7 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons.
17857. From Shan-hai-kwan, Chihli, China, 1906. Plants slender, erect, the tips twining; height 28 to 32 inches; medium late; pubescence tawny; flowers both purple and white; pods medium large, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds chromium green, medium-sized, 7 to 8 mm. long, elliptical, slightly flattened; hilum slate-black; germ green. Grown four seasons.
- 17857 B. A field mass selection in 1907. Plants slender, erect, the tips twining; height 30 to 36 inches; late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{4}$ to $2\frac{1}{8}$ inches long, compressed, scattered, shattering moderately; seeds olive-yellow, medium small, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum black; germ yellow. Grown two seasons.
17861. *Jet*. From Sachon, Chihli, China, 1906. Plants slender, erect, the tips twining; height 36 to 48 inches; medium late; pubescence gray (40 per cent) and tawny (60 per cent); flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering moderately; seeds black, medium small, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown four seasons. A variety said to be grown for fodder and considered an excellent food for stock.
17862. *Sherwood*. From Tientsin, Chihli, China, 1906. Plants slender, erect, the tips twining; height 24 to 26 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale or light brown; germ yellow. Grown four seasons. This variety is said to be excellent for making bean cheese. No. 22898 from Paotingfu, Chihli, China, is the same thing.

- 17862 B. A pure field selection in 1907. Plants stout, erect, bushy; height 32 to 38 inches; medium late; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, compressed, scattered, shattering little; seeds chromium green, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oblong, much flattened; hilum black; germ green. Grown two seasons.
- 17862 C. A field mass selection in 1907. Plants slender, suberect, the tips twining; height 32 to 38 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, 2 to $2\frac{1}{4}$ inches long, tumid, scattered, shattering moderately; seeds straw-yellow, medium small, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum seal-brown; germ yellow. Grown two seasons.
- 17862 E. A field mass selection in 1907. Plants stout, erect, bushy; height 30 to 34 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches, tumid, half crowded, shattering little; seeds olive-yellow, medium sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale to light brown; germ yellow. Grown two seasons.
- 17862 F. A field mass selection in 1907. Plants slender, erect, the tips twining; height 24 to 26 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum pale or brown; germ yellow. Grown two seasons.
- 17862 G. A pure field selection in 1907. Plants stout, erect, bushy; height 30 to 36 inches; medium late; pubescence tawny; flowers purple; pods medium sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale to light brown; germ yellow. Grown two seasons.
18227. *Chernie*. From Khabarovsk, Siberia, 1906. Plants slender, erect, the tips twining; height 22 to 28 inches; medium early; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering little; seeds black, medium-sized, $7\frac{1}{2}$ to $8\frac{1}{2}$ mm. long, oblong, much flattened; hilum pale; germ yellow; leaves persist when pods are ripening. Grown four seasons.
18258. From Pee-san, Chihli, China, 1906. Plants slender, erect, the tips twining; height 28 to 34 inches; medium late; pubescence both gray and tawny; flowers both purple and white; pods medium-sized, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oblong, much flattened; hilum brown; germ yellow. Grown four seasons.
- 18258 A. A field mass selection in 1907. Plants slender, erect, the tips twining; height 30 to 36 inches; medium late; pubescence both gray and tawny; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum seal-brown; germ yellow. Grown two seasons.
- 18258 D. A pure field selection in 1907. Plants slender, erect, the tips twining; height 30 to 34 inches; medium late; pubescence tawny; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, scattered, shattering little; seeds chromium green, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum black; germ green. Grown two seasons.

- 18258 E. A field mass selection in 1907. Plants stout, erect, bushy; height 26 to 30 inches; medium late; pubescence both gray and tawny; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds chromium green, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum black; germ green. Grown two seasons.
- 18258 N. A pure field selection in 1908. Plants stout, erect, bushy; height 28 to 32 inches; medium late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering little; seeds olive, with black saddle, medium-sized, 7 to $7\frac{1}{2}$ mm. long, oblong, much flattened; hilum black; germ yellow. Grown two seasons.
18259. *Pingsu*. From Tschang-ping-tsu, Chihli, China, 1906. Plants slender, erect, the tips twining; height 32 to 36 inches; medium late; pubescence gray (50 per cent) and tawny (50 per cent); flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering much; seeds black, small, 8 to $8\frac{1}{2}$ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown four seasons. This bean is said to be grown in the northern country as a nitrogen-supplying crop with sorghum, corn, or millet.
18459. Guelph. From West Branch, Mich., 1906. Same as No. 17261.
18460. Buckshot. From West Branch, Mich., 1906. Same as No. 17251.
18619. From Shanghai, Kiangsu, China, 1906. Plants stout, erect, bushy; height 24 to 30 inches; very late; pubescence tawny; flowers purple, pods medium-sized, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum dark brown; germ yellow. Grown four seasons. This variety is said to be used in Shanghai as a vegetable after the beans have made sprouts several inches long.
19183. *Wilson*. From Newchwang, Manchuria, 1906. Plants slender, erect, the tips twining; height 36 to 48 inches; medium late; pubescence gray (10 per cent) and tawny (90 per cent); flowers both purple and white; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds black, medium, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown three seasons. This variety has an admixture of medium-sized, subglobose, black seed with green cotyledons. This variety is said to be grown for oil, the exhausted material being exported as a very valuable fertilizer.
- 19183 B. A field mass selection in 1907. Plants slender, erect, the tips twining; height 36 to 48 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds olive-yellow, medium small, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum light brown to russet; germ yellow. Grown two seasons.
19184. *Fairchild*. From Newchwang, Manchuria, 1906. Plants stout, erect, bushy; height, 30 to 34 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds black, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown three seasons. This is said to be a very rare variety used both for food and for making a superior oil.
- 19184 A. A pure field selection in 1907. Plants stout, erect, bushy; height 34 to 38 inches; medium late; pubescence gray; flowers white; pods medium-sized, small, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons.

- 19184 C. A field mass selection in 1907. Plants slender, erect, the tips twining; height 36 to 48 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, scattered, shattering little; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum black; germ yellow. Grown two seasons.
- 19184 D. A field mass selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium late; pubescence tawny; flowers both purple and white; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering little; seeds olive-yellow, large, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
- 19184 E. A pure field selection in 1907. Plants stout, erect, bushy; height 22 to 26 inches; medium late; pubescence gray; flowers white; pods medium-sized, $1\frac{3}{4}$ to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering little; seeds olive-yellow, medium large, $7\frac{1}{2}$ to 8 mm. long, oval; hilum brown; germ yellow. Grown three seasons.
- 19184 G. A pure field selection in 1907. Plants stout, erect, bushy; height 18 to 24 inches; medium late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, crowded, shattering moderately; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum black; germ yellow. Grown two seasons.
19186. *Morse*. From Newchwang, Manchuria, 1906. Plants stout, erect, bushy; height 30 to 36 inches; medium late; pubescence gray; flowers both purple and white; pods medium large, $1\frac{3}{4}$ to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering moderately; seeds olive-yellow, medium large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown three seasons. This variety is said to be the most common one from which oil is extracted at Newchwang.
- 19186 B. A pure field selection in 1907. Plants slender, suberect, the tips twining; stems 48 to 60 inches; medium late; pubescence gray; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds black, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons.
- 19186 C. A field mass selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium late; pubescence gray; flowers both purple and white; pods large, 2 to $2\frac{1}{2}$ inches long, tumid, half crowded, shattering little; seeds cinnamon brown, medium large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened, breaking easily; hilum pale; germ yellow. Grown two seasons.
- 19186 D. A pure field selection in 1907. Plants slender, suberect, the tips twining; stems 48 to 56 inches long; medium late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds brown, medium-sized, $8\frac{1}{2}$ to 9 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons.
- 19186 F. A field mass selection in 1907. Plants slender, suberect, the tips twining; height 36 to 42 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, scattered, shattering little; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum dark brown; germ yellow. Grown two seasons.
19951. *Mammoth*. From Richmond, Va.

19981. From Yokohama, Japan, 1907. Plants stout, erect, bushy; height 18 to 22 inches; medium; pubescence gray; flowers both purple and white; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, tumid, crowded, shattering moderately; seeds straw-yellow, large, $9\frac{1}{2}$ to 10 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown three seasons. No. 19983 from Yokohama is the same, and the variety has also been obtained from Tokyo, Japan, Nos. 22882 and 22885.
- 19981 A. A field mass selection in 1907. Plants stout, erect, bushy; height 22 to 26 inches; late; pubescence gray; flowers both purple and white; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, compressed, crowded, shattering little; seeds straw-yellow, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.
- 19981 B. A pure field selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium; pubescence tawny; flowers purple; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, crowded, shattering little; seeds olive-yellow, large, $7\frac{1}{2}$ to 8 mm. long, oval; hilum black; germ yellow. Grown two seasons.
19982. From Yokohama, Japan, 1907. This is identical with Flat King, 17252.
19983. From Yokohama, Japan, 1907. This is the same variety as 19981.
19984. *Natsu*. From Yokohama, Japan, 1907. Plants stout, erect, bushy; height 18 to 30 inches; late; pubescence gray (25 per cent) and tawny (75 per cent); flowers both purple and white; pods medium large, 2 to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown three seasons.
- 19984 A. A pure field selection in 1907. Plants stout, erect, bushy; height 30 to 42 inches; medium late; pubescence tawny; flowers purple; pods medium small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds brownish olive, medium-sized, 6 to $6\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
- 19984 B. A pure field selection in 1907. Plants stout, erect, bushy; height 24 to 30 inches; late; pubescence gray; flowers white; pods medium large, 2 to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering little; seeds buff, medium large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
- 19984 D. A field mass selection in 1907. Plants stout, erect, bushy; height 36 to 42 inches; late; pubescence tawny; flowers both purple and white; pods medium large, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds olive-yellow, medium-sized, $8\frac{1}{2}$ to 9 mm. long, elliptical, much flattened; hilum clove-brown; germ yellow. Grown two seasons.
19985. *Nemo*. From Yokohama, Japan, 1907. Plants stout, erect, bushy; height 28 to 32 inches; medium late; pubescence tawny; flowers white; pods medium-sized $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light to slate-black; germ yellow. Grown three seasons.
- 19985 F. A field mass selection in 1907. Plants stout, bushy; height 32 to 38 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, tumid, scattered, shattering little; seeds olive-yellow, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum black; germ yellow. Grown three seasons.
- 19985 K. A field mass selection in 1908. Plants stout, erect, bushy; height 24 to 30 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to 2 inches, tumid, half crowded, shattering little; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown one season.

19986. *Okute*. From Yokohama, Japan, 1907. Plants stout, erect, bushy; height 14 to 18 inches; early; pubescence tawny; flowers both purple and white; pods large, 2 to 2½ inches long, tumid, half crowded, shattering little; seeds olive-yellow, large, 9½ to 10 mm. long, elliptical, much flattened; hilum slate-colored; germ yellow. Grown three seasons. This variety was also received from Tokyo, Japan, No. 22877.
19987. From Yokohama, Japan. Very similar to, if not identical with Buckshot, 17251.
20011. From Ko-bau, northern Korea, 1906. Plants stout, erect, bushy; height 15 to 18 inches; medium; pubescence tawny; flowers purple; pods medium-sized, 1½ to 1¾ inches long, compressed, half crowded, shattering little; seeds olive-yellow, small to medium, 6½ to 7 mm. long, elliptical, much flattened; hilum seal-brown; germ yellow; leaves persisting when pods are ripening. Grown three seasons. This variety is said to be grown at high elevation in Korea.
- 20011 A. A pure field selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium; pubescence tawny; flowers purple; pods medium-sized, 1½ to 1¾ inches long, compressed, scattered, shattering little; seeds straw-yellow, small, 6½ to 7 mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown two seasons.
20405. *Habaro*. From Khabarovsk, Siberia, 1906. Plants stout, erect, bushy; height 18 to 24 inches; medium; pubescence both gray and tawny; flowers purple; pods medium-sized, 1½ to 1¾ inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, 7½ to 8 mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown three seasons.
- 20405 B. *Chestnut*. A field mass selection in 1907. Plants stout, erect, bushy; height 24 to 30 inches; medium early; pubescence gray (25 per cent) and tawny (75 per cent); flowers purple; pods medium-sized, 1½ to 1¾ inches long, tumid, half crowded, shattering little; seeds brown, medium large, 7 to 7½ mm. long, oblong, much flattened; hilum pale; germ yellow; leaves persist when pods are ripening. Grown two seasons.
- 20405 C. A pure field selection in 1907. Plants stout, erect, bushy; height 20 to 26 inches; medium; pubescence tawny; flowers purple; pods medium-sized, 1½ to 1¾ inches long, tumid, half crowded, shattering moderately; seeds olive-yellow, medium-sized, 7½ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
20406. *Elton*. From Khabarovsk, Siberia, 1906. Plants stout, erect, bushy; height 28 to 32 inches; medium early; pubescence both gray and tawny; flowers purple; pods medium large, 1¾ to 2 inches long, compressed, half crowded, shattering little; seeds straw-yellow, medium large, 7½ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown three seasons.
- 20406 C. A pure field selection in 1907. Plants stout, erect, bushy; height 18 to 22 inches; medium; pubescence tawny; flowers purple; pods medium-sized, 1¾ to 2 inches long, tumid, scattered, shattering little; seeds straw-yellow with brown saddle, medium-sized, 8 to 9 mm. long, elliptical, much flattened; hilum brown; germ yellow; leaves persisting while pods are ripening. Grown two seasons.
- 20406 E. A pure field selection in 1907. Plants stout, erect, bushy; height 12 to 16 inches; medium; pubescence tawny; flowers purple; pods medium-sized, 1½ to 2 inches long, tumid, crowded, shattering moderately; seeds olive-yellow, medium-sized, 8 to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.

- 20406 G. A pure field selection in 1907. Plants stout, erect, bushy; height 24 to 28 inches; medium early; pubescence gray; flowers purple; pods large, 2 to 2½ inches long, compressed, half crowded, shattering little; seeds light brown, large, 8½ to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
20407. *Brindle*. From Merkoechofka, Siberia, 1906. Plants stout, erect, bushy; height 16 to 20 inches; medium; pubescence tawny; flowers purple; pods large, 1¾ to 2¼ inches long, tumid, half crowded, shattering little; seeds brown and black, the colors somewhat concentrated in bands, large, 8 to 9 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown three seasons. This variety is said to be used in Siberia for human food, being boiled with millet.
- 20407 B. A field mass selection in 1907. Plants stout, erect, bushy; height 18 to 24 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, 1½ to 1¾ mm. long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, 8½ to 9 mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown two seasons.
20408. From Khabarovsk, Siberia, 1906. Seeds black. They failed to germinate in 1907.
20409. *Hansen*. From Merkoechofka, Siberia, 1906. Plants slender, erect, the tips twining; height 16 to 20 inches; early; pubescence tawny; flowers purple; pods small, 1¼ to 1½ mm. long, tumid, crowded, shattering little; seeds brown, very small, 5 to 5½ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown three seasons.
20410. From Merkoechofka, Siberia, 1906. Plants stout, erect, bushy; height 12 to 15 inches; medium early; pubescence tawny; flowers purple; pods small, 1¼ to 1½ inches long, compressed, half crowded, shattering much; seeds black, small, 6 to 6½ mm. long, elliptical, much flattened; hilum pale; germ yellow; leaves persist when pods are ripening. Grown three seasons.
20411. From Merkoechofka, Siberia, 1906. Plants stout, erect, bushy; height 16 to 20 inches; medium early; pubescence tawny; flowers both purple and white; pods small, 1¼ to 1½ inches long, tumid, crowded, shattering moderately; seeds dull black marbled with brown, small, 5 to 5½ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown three seasons.
20412. *Merko*. From Merkoechofka, Siberia, 1906. Plants slender, erect, the tips twining; height 28 to 32 inches; medium early; pubescence gray (60 per cent) and tawny (40 per cent); flowers both purple and white; pods medium small, 1½ to 1¾ inches long, compressed, scattered, shattering little; seeds brown, small, 7½ to 8 mm. long, oblong, much flattened, hilum pale; germ yellow; leaves persist when pods are ripening. Grown three seasons.
- 20412 A. A pure field selection in 1907. Plants stout, erect, bushy; height 16 to 18 inches; medium; pubescence tawny; flowers purple; pods medium-sized, 1¾ to 2 inches long, compressed, half crowded, shattering little; seeds deep brown, medium small, 7½ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow; leaves persist when pods are ripening. Grown two seasons.
- 20412 B. A pure field selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium; pubescence tawny; flowers purple; pods medium-sized, 1½ to 1¾ inches long, tumid, half crowded, shattering moderately; seeds olive to mummy brown, medium large, 7½ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow; leaves persist when pods are ripening. Grown two seasons.

20414. From Merkoechofka, Siberia, 1906. Identical with Chernie, 18227.
20629. From Manchuria, March, 1907. Seeds failed to germinate.
20699. From Usuri Province, Siberia, March, 1907. Seeds failed to germinate.
20797. *Riceland*. From Chinhaufu, near Shanghai, Kiangsu, China, 1907. Plants slender, erect, very leafy; height 36 to 42 inches; very late; pubescence tawny; flowers purple; pods medium small, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds black, medium small, $6\frac{1}{2}$ to 7 mm. long, oblong; much flattened; hilum pale; germ yellow. Grown three seasons. No. 23337 from Shanghai is the same thing. This variety is said to be grown as a second crop in low-lying rice fields and mainly used as a fodder for domestic animals. It is not quite identical with the original *Riceland*, No. 6560.
20798. *Barchet*. From Chinhaufu, Kiangsu, China, 1907. Plants slender, erect, very leafy; height 36 to 42 inches; late; pubescence tawny; flowers purple; pods medium small, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds dark olive-brown, medium-sized, $6\frac{1}{2}$ to 7 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown three seasons. This variety has also been grown under No. 23336 from Shanghai, China, and 9344 is almost certainly the same thing.
- 20798 C. A selection out of the original seed of 20798. Plants stout, erect, bushy; height 30 to 36 inches; very late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds olive-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum burnt umber; germ yellow; leaves persist while pods are ripening. Grown two seasons.
- 20798 E. A selection out of the original seed of 20798. Plants slender, erect, the tips twining; height 36 to 42 inches; very late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds olive-yellow, $6\frac{1}{2}$ to 7 mm. long, elliptical, much flattened; hilum dark brown; germ yellow. Grown two seasons.
20854. *Tashing*. From Harbin, Manchuria, 1907. Plants stout, erect, bushy; height 14 to 18 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds chromium green, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum black; germ green. Grown three seasons.
20892. From Kobe, Japan, 1907. Plants stout, erect, bushy; height 24 to 30 inches; late; pubescence gray (5 per cent) and tawny (95 per cent), flowers both purple and white; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown three seasons.
- 20892 A. A pure field selection in 1908. Plants stout, erect, bushy; height 12 to 18 inches; medium early; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
20893. From Kobe, Japan, 1907. This proved to be identical with Tokyo, 17264.
- 20893 A. A pure field selection in 1908. Plants stout, erect, bushy; height 24 to 30 inches; late; pubescence tawny; flowers purple; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, crowded, shattering moderately; seeds straw-yellow, very large, 9 to $9\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.

21079. *Shingto*. From Tieling, Manchuria, 1907. Plants stout, erect, bushy; height 24 to 30 inches; medium; pubescence tawny; flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, scattered, shattering little; seeds olive-yellow, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum light to slate-black; germ yellow. Grown three seasons. This variety is said to be used to produce bean oil and bean cake.
- 21079 A. *Auburn*. A field mass selection in 1907. Plants stout, erect, bushy; height 24 to 28 inches; medium early; pubescence gray (30 per cent) and tawny (70 per cent); flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, half crowded, shattering little; seeds black, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum pale; germ green. Grown two seasons.
- 21079 D. A field mass selection in 1907. Plants stout, erect, bushy; height 20 to 24 inches; medium; pubescence tawny; flowers both purple and white; pods medium sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum dark brown; germ yellow. Grown two seasons.
- 21079 H. A pure field selection in 1907. Plants stout, erect, bushy, height 24 to 30 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed; crowded, shattering moderately; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown two seasons.
21080. From Tieling, Manchuria, 1907. Plants stout, erect, bushy; height 14 to 18 inches; medium; pubescence tawny; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds chromium green, medium-sized, 9 to $9\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ green. Grown three seasons. This variety is said to be the most expensive of all the soy beans at Tieling and is eaten only by the better classes of Chinese.
- 21080 K. A field selection in 1908. Plants stout, erect, bushy; height 22 to 26 inches; medium early; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds smoky yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown one season.
- 21080 L. A field selection in 1908. Plants stout, erect, bushy; height 12 to 16 inches; medium early; pubescence tawny; flowers white; pods large, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long; tumid, crowded, shattering a little; seeds dark brown, large, 10 to $10\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
- 21080 N. A field selection in 1908. Plants stout, erect, bushy; height 12 to 16 inches; medium early; pubescence tawny; flowers both purple and white; pods medium large, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering little; seeds chromium green, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown one season.
21731. *Mammoth*. From Hickory, N. C.
21754. From Vilmorin-Andrieux & Co., Paris, France, 1908. Plants stout, bushy, erect; height 10 to 14 inches; medium; pubescence tawny; flowers purple; pods medium sized, $1\frac{3}{4}$ to 2 inches long, tumid, crowded, shattering little; seeds straw-yellow, medium small, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum seal-brown; germ yellow. Grown two seasons, This variety was also obtained from Dammann & Co., Naples, Italy, and grown under S. P. I. No. 22414.

21755. From Vilmorin-Andrieux & Co., Paris, France, 1908. Plants stout, bushy, erect; height 12 to 16 inches; very early; pubescence tawny; flowers white; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering moderately; seeds deep brown, medium large to large, 8 to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Except for length of season, this could not be distinguished from 17258, Ogemaw. Grown two seasons.
21756. From Vilmorin-Andrieux & Co., Paris, France, 1908. This is identical with 18227.
21757. Identical with the preceding and from the same source.
21818. From Vilmorin-Andrieux & Co., Paris, France, 1908. This could not be distinguished from Ito San, 17268.
21825. From Hokkaido, Japan, 1908. Plants stout, erect, bushy; height, 16 to 20 inches, medium early; pubescence tawny; flowers purple; pods medium-sized; $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons. This variety is said to be used principally in the manufacture of "soy," "miso," "tifu," etc. It has also been obtained again from the same place and grown under Nos. 21830 and 21831.
21830. From Hokkaido, Japan, 1908.
21831. From Hokkaido, Japan, 1908.
- Both these numbers produced plants that were identical with 21825.
21946. From Buitenzorg, Java, 1908. A black-seeded variety, but the seeds failed to germinate.
21999. *Taha*. From Boshan, Shangtung, China, 1907. Plants slender, erect, the tips twining; height, 28 to 32 inches; medium late; pubescence gray (5 per cent) and tawny (95 per cent); flowers both purple and white; pods large, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds black with olive saddle, large, 9 to 10 mm. long, elliptical, much flattened; hilum black; germ yellow. Grown two seasons. This is said to be a rare variety of soy bean, used by the higher classes of Chinese as a vegetable in soups.
- 21999 B. A mass selection out of the original seed. Plants slender, erect, the tips twining; height, 36 to 48 inches; late; pubescence tawny; flowers white; pods large, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds brown, large, 8 to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
- 21999 C. A mass selection out of the original seed. Plants slender, erect, the tips twining; height, 42 to 48 inches; late; pubescence gray (40 per cent) and tawny (60 per cent); flowers both purple and white; pods scattered, shattering little, medium-sized, $1\frac{1}{2}$ to 2 inches long, compressed; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum slate-black; germ yellow. Grown two seasons.
- 21999 D. A mass selection out of the original seed. Plants slender, erect, the tips twining; height, 30 to 42 inches; late; pubescence tawny; flowers both purple and white; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, tumid, half crowded, shattering little; seeds olive-yellow, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum black; germ yellow. Grown two seasons.
22311. From Shanghai, China, 1908. This proved to be the same as 14952 from the same place.

22312. *Farnham*. From Shanghai, China, 1908. Plants stout, erect, bushy; height 36 to 40 inches; late; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, scattered, shattering moderately; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons.
22317. From Haage & Schmidt, Erfurt, Germany, 1908. A yellow-seeded sort, but the seed did not germinate.
22318. From Erfurt, Germany, 1908. Plants stout, erect, bushy; height, 24 to 32 inches; very late; pubescence gray; flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, scattered, shattering little; seeds straw-yellow, medium-sized; 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.
- 22318 A. A field selection in 1908. Plants stout, erect, bushy; height 36 to 40 inches; late; pubescence gray; flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds straw-yellow, medium small, $5\frac{1}{2}$ to 6 mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown one season.
22319. From Haage & Schmidt, Erfurt, Germany, 1908. A brown-seeded variety, but the seed did not germinate.
22320. From Haage & Schmidt, Erfurt, Germany, 1908, as "Green from Samarow." Identical with Guelph, 17261.
22321. From Haage & Schmidt, Erfurt, Germany. Identical with Chernie, 18227.
22322. From Haage & Schmidt, Erfurt, Germany, 1908, as "Early Black from Podolia." The same thing as Buckshot, 17251.
22333. *Baird*. The progeny of 17256 A. Selected out of 17256, grown from 6414 from Pingyang, Korea, 1901. Plants stout, erect, bushy; height 30 to 36 inches; late; pubescence gray; flowers both purple and white; pods medium small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, tumid, half crowded, shattering little; seeds brown, medium small, $5\frac{1}{2}$ to 6 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown nine seasons.
22334. From the Illinois Agricultural Experiment Station, 1908. Identical with Nuttall, 17253, and, as the records show, grown from seed obtained from the Department of Agriculture.
22335. From the Illinois Agricultural Experiment Station, 1908. Plants stout, erect, bushy; height 16 to 20 inches; medium; pubescence gray and tawny; flowers white; pods medium-sized, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, $6\frac{1}{2}$ to 7 mm. long, oval; hilum pale; germ yellow. Grown two seasons.
22336. From the Illinois Agricultural Experiment Station, 1908. Both this and 22337 proved to be identical with Guelph, 17261.
- 22336 A. A pure field selection in 1908. Plants stout, erect, bushy; height 12 to 15 inches; medium early; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds black, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ green. Grown one season.
22337. See 22336.
22379. *Swan*. From Canton, Kwangtung, China, 1908. Plants stout, erect, bushy; height 26 to 30 inches; medium; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering moderately; seeds straw-yellow, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.

22380. From Canton, Kwangtung, China, 1908. Plants slender, erect, the tips twining; height 30 to 36 inches; late; pubescence tawny; flowers white; pods large, 2 to 2½ inches long, compressed, scattered, shattering moderately; seeds black, large, 7½ to 8½ mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown two seasons.
22381. From Canton, Kwangtung, China, 1908. Plants stout, erect, bushy; height 18 to 24 inches; late; pubescence gray (25 per cent) and tawny (75 per cent); flowers both purple and white; pods medium large, 2 to 2½ inches long, tumid, crowded, shattering moderately; seeds olive-yellow, medium-sized; 7½ to 8 mm. long, oval; hilum pale; germ yellow. Grown two seasons.
- 22381 B. A pure selection in 1908. Plants stout, erect, bushy; height 12 to 16 inches; medium early; pubescence tawny; flowers white; pods large, 2 to 2½ inches long, tumid, half crowded, shattering little; seeds olive-yellow (smoky), large, 9½ to 10 mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown one season.
22406. *Hongkong*. From Hongkong, Kwangtung, China, 1908. Plants stout, erect, bushy; height 24 to 30 inches; medium late; pubescence tawny; flowers both purple and white; pods scattered, shattering little, 1¾ to 2 inches long, tumid; seeds black, medium-sized, 7½ to 8 mm. long, oblong, slightly flattened; hilum pale; germ green. Grown two seasons.
22407. *Nigra*. From Hongkong, China, 1908. Plants slender, erect, the tips twining; height 24 to 30 inches; medium; pubescence gray (8 per cent) and tawny (20 per cent); flowers both purple and white; pods medium-sized, 1¾ to 2 inches long, tumid, scattered, shattering moderately; seeds black, medium-sized, 8½ to 9 mm. long, oblong, much flattened; hilum pale; germ green. Grown two seasons.
22411. From Dammann & Co., Naples, Italy, 1908, as "Samarow." This proved to be identical with 17260.
- 22411 A. A pure field selection in 1907. Plants stout, erect, bushy; height 12 to 16 inches; medium early; pubescence tawny; flowers purple; pods small, 1¼ to 1½ inches long, compressed, crowded, shattering much; seeds dull brown, very small, 5 to 5½ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons.
22412. From Dammann & Co., Naples, Italy, 1908. The plants were exactly like Chernie, 18227.
22413. From Dammann & Co., Naples, Italy. Seeds brown, but none germinated.
22414. From Dammann & Co., Naples, Italy, 1908. This is exactly the same variety as 21754.
22415. From Dammann & Co., Naples, Italy, as "Giant Yellow." The plants and seeds of this can not be distinguished from Butterball, 17273.
22428. Wild soy bean from the botanic gardens, Tokyo, Japan, 1908. Plants very slender, very vining, procumbent; length of stems 36 to 48 inches; very late; pubescence tawny; flowers purple; pods small, ¾ to 1½ inches long, compressed, scattered, shattering very much; seeds dull black, oblong, much flattened, very small, 3½ to 4 mm. long; hilum pale; germ yellow. Grown three seasons. (See Pl. I.) No. 25138, from Soochow, Kiangsu, China, is identical. (See Pl. II, fig. 1.) This is the wild form of the soy bean. It volunteers very readily at Arlington Experimental Farm, the seedlings appearing about May 1. Were it not that the seed shatters so badly, the plant would have promise as a cover crop.

22498. From Hangchow, Chekiang, China, 1908. Plants stout, erect, bushy; height 16 to 20 inches; very late; pubescence tawny; flowers purple; pods scattered, never fully maturing at Arlington Experimental Farm; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum dark brown; germ yellow. Grown two seasons.
22499. From Hangchow, Chekiang, China. Seeds straw-yellow, but none germinated.
22500. From Hangchow, Chekiang, China, 1908. Plants stout, erect, bushy; height 24 to 28 inches; very late; pubescence tawny; flowers white; pods half crowded; seeds chromium green, medium-sized, 9 to 10 mm. long, elliptical, slightly flattened; hilum brown; germ green. Grown two seasons.
22501. From Hangchow, China, 1908. Plants slender, erect, the tips twining; height 42 to 48 inches; very late; pubescence tawny; flowers white; pods medium large, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds black, medium large, 7 to $7\frac{1}{2}$ mm. long, subglobose; hilum pale; germ green. Grown two seasons.
22503. From Yokohama, Japan, 1908. Plants stout, erect, bushy; height 12 to 16 inches; medium; pubescence gray; flowers purple; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, tumid, crowded, shattering moderately; seeds straw-yellow, large, $9\frac{1}{2}$ to 10 mm. long, subglobose; hilum pale; germ yellow. Grown two seasons.
22504. From Yokohama, Japan, 1908. Plants stout, erect, bushy; height 18 to 24 inches; late; pubescence tawny; flowers purple; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, tumid, crowded, shattering much; seeds olive-yellow, large, 8 to 9 mm. long, subglobose; hilum pale; germ yellow. Grown two seasons.
- 22504 A. A selection out of the original seed 22504, Plants stout, erect, bushy; height 14 to 18 inches; medium; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, crowded, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
22505. From Yokohama, Japan, 1908. Plants stout, erect, bushy; height 20 to 28 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering little; seeds straw-yellow, medium-sized, $6\frac{1}{2}$ to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons.
22506. From Yokohama, Japan, 1908. Plants stout, erect, bushy; height 12 to 16 inches; medium; pubescence gray; flowers purple; pods medium large, 2 to $2\frac{1}{4}$ inches long, tumid, crowded, shattering much; seeds straw-yellow, medium-sized, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown two seasons.
22507. From Yokohama, Japan, 1908. Plants stout, erect, bushy; height, 18 to 22 inches; medium; pubescence tawny; flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering much; seeds olive-yellow, medium large, $8\frac{1}{2}$ to 9 mm. long, subglobose; hilum brown; germ yellow. Grown two seasons.
22534. From Weihsien, China, 1908. Plants slender, erect, the tips twining; height, 36 to 42 inches; late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering moderately; seeds straw-yellow, medium small, $7\frac{1}{2}$ to 8 mm. long, oval; hilum brown; germ yellow. Grown two seasons. This variety is said to be used for making lamp and cooking oil and for flour to make cakes. The remaining material after expressing the oil forms a cake which is exported for feeding animals and enriching land.

22535. From Weihsien, China, 1908. The seeds and plants of this are identical with Cloud, 16790.
22536. From Chefoo, Shantung, China, 1908. This proved identical with 17857.
22537. From Chefoo, Shantung, China, 1908. Plants stout, erect, bushy; height, 18 to 30 inches; late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering moderately; seeds olive-yellow, medium-sized, $8\frac{1}{2}$ to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons. This variety is said to be used quite extensively at Chefoo for the manufacture of oil.
22538. From Chefoo, Shantung, China, 1908. Plants slender, erect, the tips twining; height, 36 to 42 inches; medium late; pubescence gray (50 per cent) and tawny (50 per cent); flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering moderately; seeds black, medium-sized, 6 to $6\frac{1}{2}$ mm. long, oblong, much flattened; germ yellow. Grown two seasons.
22633. *Morgan*. From Sheklung, Kwangtung, China, 1908. Plants slender, erect, the tips twining; height, 36 to 42 inches; very late; pubescence tawny; flowers both purple and white; pods medium small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds olive-yellow, small, $5\frac{1}{2}$ to 6 mm. long, elliptical, much flattened; hilum russet; germ yellow. Grown two seasons.
22634. From Sheklung, Kwangtung, China, 1908. Plants stout, erect, bushy; height, 22 to 28 inches; medium late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, half crowded; shattering moderately; seeds black, medium small, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
22644. *Stuart*. From Hangchow, Chekiang, China, 1908. Plants stout, erect, bushy; height, 36 to 40 inches; very late; pubescence gray; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds olive-yellow, medium small, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum russet; germ yellow. Grown two seasons.
- 22644 A. A pure field selection in 1908. Plants stout, erect, bushy; height, 36 to 42 inches; very late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds seal-brown to olive, medium small, elliptical, $6\frac{1}{2}$ to 7 mm. long, much flattened; hilum pale; germ yellow. Grown one season.
- 22644 B. *Nielsen*. A pure selection out of the original seed of 22644. Plants stout, erect, bushy; height, 34 to 38 inches; very late; pubescence gray; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum burnt umber; germ yellow. Grown two seasons.
- 22644 C. A selection in 1908. Plants stout, erect, bushy; height, 24 to 30 inches; very late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, compressed, scattered, shattering little; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown one season.
22645. From Hangchow, Chekiang, China, 1908. Plants stout, erect, bushy; height, 16 to 20 inches; medium; pubescence tawny; flowers purple; pods medium large, 2 to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering moderately; seeds olive-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum bister brown; germ yellow. Grown two seasons.

22646. From Hangchow, Chekiang, China, 1908. Plants stout, erect, bushy; height, 30 to 36 inches; very late; pubescence gray; flowers purple; medium-sized pods large, 2 to 2½ inches long, compressed, scattered, shattering little; seeds olive-yellow, large, 8 to 9 mm. long, elliptical, much flattened; hilum russet; germ yellow. Grown two seasons.
22714. From Saigon, Cochin China, 1908. Plants stout, erect, bushy; height, 30 to 36 inches; very late; pubescence gray; flowers both purple and white; pods scattered; seeds straw-yellow, medium-sized, 7½ to 8 mm. long, elliptical, much flattened; hilum light brown; germ yellow. Grown two seasons.
22874. *Vireo*. From Tokyo, Japan, 1908. Plants stout, erect, bushy; height, 14 to 18 inches; early; pubescence tawny; flowers both purple and white; pods medium-sized, 1½ to 2 inches long, tumid, crowded, shattering little; seeds olive-yellow, medium small, 6 to 6½ mm. long, elliptical, slightly flattened; hilum slate-color; germ yellow; leaves persist when pods are ripening. Grown two seasons.
22875. From Tokyo, Japan, 1908. This proved the same as Flat King, 17252.
22876. From Tokyo, Japan, 1908. Plants stout, erect, bushy; height, 16 to 22 inches; medium; pubescence gray and very sparse; flowers purple; pods medium-sized, 1½ to 2 inches long, tumid, half crowded, shattering little; seeds straw-yellow, small to medium, 6½ to 7½ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons.
22877. From Tokyo, Japan, 1908. This was found to be the same as Okute, 19986.
22878. From Tokyo, Japan, 1908. This did not differ in any respect from 17273.
22879. From Tokyo, Japan, 1908. Plants stout, erect, bushy; height, 20 to 26 inches; medium; pubescence gray; flowers both purple and white; pods medium small, 1¾ to 2 inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium small, 6½ to 7 mm. long, elliptical, much flattened; hilum light to seal-brown; germ yellow. Grown two seasons.
22880. From Tokyo, Japan, 1908. Plants stout, erect, bushy; height, 18 to 22 inches; medium; pubescence gray (60 per cent) and tawny (40 per cent); flowers both purple and white; pods medium-sized, 1¾ to 2 inches long, compressed, half crowded, shattering little; seeds straw-yellow, medium-sized, 7½ to 8 mm. long, elliptical, much flattened; hilum pale to brown; germ yellow. Grown two seasons.
- 22880 A. A selection in 1908. Plants stout, erect, bushy; height, 28 to 32 inches; medium early; pubescence gray; flowers both purple and white; pods medium large, 2 to 2½ inches long, tumid, scattered, shattering little; seeds straw-yellow (cloudy saddle); medium large, 8 to 8½ mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown one season.
- 22880 B. A selection in 1908. Plants stout, erect, bushy; height, 12 to 16 inches; medium early; pubescence gray; flowers purple; pods medium-sized, 1½ to 2 inches long, compressed, crowded, shattering little; seeds chromium green, medium-sized, 7½ to 8 mm. long, elliptical, much flattened; hilum brown; germ green. Grown one season.
- 22880 C. A selection in 1908. Plants stout, erect, bushy; height, 14 to 18 inches; yellow; pubescence tawny; flowers purple; pods medium-sized, 1½ to 2 inches long, tumid, half crowded, shattering little; seeds straw-yellow (cloudy); medium-sized, 6½ to 7 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown one season.
22881. From Tokyo, Japan, 1908. Identical with Hope, 17267.

22882. From Tokyo, Japan, 1908. Identical with 19981.
22883. From Tokyo, Japan, 1908. Identical with 19987.
22884. From Tokyo, Japan, 1908. Identical with Butterball, 17273.
22885. From Tokyo, Japan, 1908. Identical with 19981.
22886. From Swatow, Kwantung, China, 1908. Identical with Ebony, 17254.
22897. *Columbia*. From Paotingfu, Chihli, China, 1908. Plants stout, erect, bushy; height, 28 to 34 inches; late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, crowded, shattering little; seeds chromium green, small, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ green. Grown two seasons.
22898. From Paotingfu, Chihli, China, 1908. This was grown in 1908 and found to be indistinguishable from Sherwood, 17862.
- 22898 A. *Lowrie*. A field mass selection in 1908. Plants stout, erect, bushy; height 30 to 34 inches; medium; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, scattered, shattering little; seeds olive-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum light to slate-black; germ yellow. Grown one season.
22899. *Arlington*. From Paotingfu, Chihli, China, 1908. Plants slender, erect, the tips twining; height 30 to 36 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering moderately; seeds black, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons. This variety is said to be boiled as a fodder for horses and mules. Oil is also expressed out of it and the remaining material used as fertilizer.
- 22899 A. A mass selection out of the original seed. Plants slender, suberect, the tips twining; stems 48 to 56 inches long; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed; seeds black, medium-sized, 7 to $7\frac{1}{2}$ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons.
22900. From Paotingfu, Chihli, China, 1908. Plants slender, erect, the tips twining; height 30 to 40 inches; late; pubescence tawny; flowers both purple and white; pods large, $1\frac{3}{4}$ to 2 inches long, tumid, scattered, shattering moderately, seeds black, large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown two seasons.
22901. From Paotingfu, Chihli, China, 1908. Plants stout, erect, bushy; height 24 to 30 inches; medium; pubescence gray (40 per cent) and tawny (60 per cent); flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering little; seeds straw-yellow, small to medium small, 6 to 7 mm. long, elliptical, much flattened; hilum slate-black; germ yellow. Grown two seasons.
22919. From Ingchung, Fukien, China, 1908. Plants slender, erect, the tips twining; height 36 to 48 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, scattered, shattering much; seeds black, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown two seasons.
22920. From Ingchung, Fukien, China, 1908. Plants stout, erect, bushy; height 16 to 24 inches; medium late; pubescence gray; flowers both purple and white; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering moderately; seeds olive-yellow, medium large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons.

- 22920 A. A selection out of the original seed. Plants slender, erect, the tips twining; height 32 to 36 inches; medium late; pubescence tawny; flowers both purple and white; pods medium large, $1\frac{3}{4}$ to $2\frac{1}{4}$ inches long, tumid, scattered, shattering little; seeds olive-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum light to seal-brown; germ yellow. Grown two seasons.
22921. From Ingchung, Fukien, China, 1908. Plants slender, suberect, the tips twining; height 36 to 48 inches; medium late; pubescence gray (50 per cent) and tawny (50 per cent); flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering much; seeds straw-yellow, medium small to medium, 6 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum black; germ yellow. Grown two seasons.
- 22921 A. A mass selection in 1908. Plants slender, erect, the tips twining; height 18 to 24 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering much; seeds straw-yellow, medium small to medium, $7\frac{1}{2}$ to 8 mm. long, oval, slightly flattened; hilum raw umber; germ yellow. Grown one season.
- 22921 B. A selection in 1908. Plants stout, erect, bushy; height 12 to 18 inches; late; pubescence tawny; flowers white; pods medium large, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds straw-yellow, large, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum black; germ yellow. Grown one season.
22922. From Ingchung, Fukien, China, 1908. Plants stout, erect, bushy; height 30 to 34 inches; medium; pubescence gray; flowers both purple and white; pods medium large, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds straw-yellow; medium large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum light to dark brown; germ yellow. Grown two seasons.
- 22922 A. A field mass selection in 1908. Plants stout, erect, bushy; height 30 to 36 inches; medium late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, scattered, shattering moderately; seeds straw-yellow, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown one season.
22927. From Shanghai, Kiangsu, China, 1908. Plants slender, erect, the tips twining; height 36 to 42 inches; late; pubescence tawny; flowers both purple and white; pods large, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds black, large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown two seasons.
23205. From Shanghai, Kiangsu, China, 1908. Plants stout, erect, bushy; height 24 to 30 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering little; seeds black, medium small, $6\frac{1}{2}$ to 7 mm. long, elliptical, much flattened; germ yellow. Grown one season. This is said to be an important bean for dry rice land.
23207. From Soochow, Kiangsu, China, 1908. Plants stout, erect, bushy; height 24 to 28 inches; very late; pubescence tawny; flowers white; pods half crowded; seed solive-yellow, large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum slate-black; germ yellow. Grown one season.

- 23207 B. A pure selection out of the original seed. Plants stout, erect, bushy; height 30 to 34 inches; very late; pubescence tawny; flowers white; pods large, $2\frac{1}{4}$ to $2\frac{3}{4}$ inches long, compressed, crowded, shattering little; seeds straw-yellow, large, 9 to $9\frac{1}{2}$ mm. long, elliptical, much flattened; hilum seal-brown; germ yellow. Grown one season.
23208. From Tangsi, Chekiang, China, 1908. Plants slender, suberect, the tips twining; height 30 to 36 inches; very late; pubescence gray; flowers purple; pods large, half crowded; seeds straw-yellow, large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown one season.
23209. From Tangsi, Chekiang, China, 1908. Plants stout, erect, bushy; height 24 to 28 inches; very late; pubescence gray and tawny; flowers purple; pods medium large, 2 to $2\frac{1}{4}$ inches long, compressed, half crowded, shattering little; seeds straw-yellow, medium large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow. Grown two seasons.
- 23209 A. A pure selection out of the original seed. Plants stout, erect, bushy; height 36 inches; very late; pubescence tawny; flowers white; pods medium-sized, 2 to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds chromium green, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ green. Grown one season.
23211. From Tangsi, Chekiang, China, 1908. Plants slender, erect, the tips twining; height 30 to 36 inches; very late; pubescence both gray and tawny; flowers purple; pods large, 2 to $2\frac{1}{2}$ inches long, compressed, half crowded, shattering little; seeds deep brown, medium large, 7 to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
23212. From Hangchow, Chekiang, China, 1908. Seeds yellow, but none germinated.
23213. From Hangchow, Chekiang, China, 1908. Plants slender, erect, the tips twining; height 24 to 30 inches; very late; pubescence tawny; flowers purple; pods half crowded; seeds straw-yellow, large, 8 to $8\frac{1}{2}$ mm. long, oval; hilum prominent seal-brown; germ yellow. Grown one season.
- 23213 A. A selection out of the original seed. Plants stout, erect, bushy; height 20 to 24 inches; very late; pubescence tawny; flowers purple and white; pods half crowded; seeds yellow and black, medium large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum seal-brown; germ yellow. Grown one season.
23229. *Sedo*. From Tientsin, Chihli, China, 1908. Plants stout, erect, bushy; height 20 to 26 inches; medium; pubescence tawny; flowers purple; pods medium large, $1\frac{1}{8}$ to $2\frac{1}{4}$ inches long, tumid scattered, shattering little; seeds deep brown, very large, 9 to 10 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons. This variety is said to be rare and used only for human food.
23232. From Chinhuafu, Kiangsu, China, 1908. Plants slender, erect, the tips twining; height 34 to 40 inches; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{8}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds dull brown, small, $5\frac{1}{2}$ to 6 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons. This variety is said to be grown on wet rice lands throughout central China.

23291. From Wutaishan, Shansi, China, 1908. Plants slender, erect, the tips twining; height 30 to 42 inches; medium late; pubescence gray (50 per cent) and tawny (50 per cent); flowers purple; pods medium small, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds black, medium-sized, 7 to 8 mm. long, oblong, much flattened; germ yellow. Grown one season. "This variety is considered by the Chinese to be the best food for their hard-working horses and mules."
23292. From Wutaishan, Shansi, China, 1908. Plants stout, erect, bushy; height 18 to 24 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, compressed, half crowded, shattering little; seeds small to medium, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum brown. Grown two seasons. This variety is said to be used all through northern China for making bean curd and bean vermicelli.
- 23292 A. A selection out of the original seed. Plants stout, erect, bushy; height 26 to 30 inches; medium; pubescence tawny; flowers purple; pods medium-sized; $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds medium-sized, 7 to 8 mm. long, oblong, much flattened; germ yellow. Grown one season.
- 23292 B. A selection out of the original seed. Plants slender, erect, the tips twining; height 24 to 30 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, compressed, half crowded, shattering moderately; seeds brown, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown one season.
- 23292 C. A selection out of the original seed. Plants stout, erect, bushy; height 28 to 34 inches; late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds chromium green, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oblong, much flattened; hilum seal-brown; germ green. Grown one season.
23296. From Taichow, Chekiang, China, 1908. A variety found growing on strongly alkaline lands. Plants stout, erect, bushy; height 30 to 36 inches; medium; pubescence tawny; flowers both purple and white; pods medium sized, $1\frac{1}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds straw-yellow, medium-sized, $8\frac{1}{2}$ to 9 mm. long, elliptical much flattened; hilum slate-black; germ yellow. Grown two seasons.
- 23296 A. A selection out of the original seed. Plants stout, erect, bushy; height 24 to 30 inches; medium late; pubescence tawny; flowers white; pods medium large, $1\frac{1}{4}$ to 2 inches long, compressed, half crowded, shattering moderately; seeds chromium green, medium large, 9 to 10 mm. long, elliptical, much flattened; hilum bistre brown; germ green. Grown one season.
- 23296 C. A selection out of the original seed. Plants stout, erect, bushy; height 20 to 24 inches; medium; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering little; seeds black, medium-sized, $8\frac{1}{2}$ to 9 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown one season.
23297. From Taichow, China, 1908. Plants slender, erect, the tips twining; height 28 to 34 inches; medium late; pubescence gray and tawny; flowers purple, pods medium-sized, $1\frac{1}{4}$ to 2 inches long, compressed, half-crowded, shattering little; seeds black, medium-sized, $7\frac{1}{2}$ to 8 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown two seasons.

- 23297 A. A selection out of the original seed. Plants slender, erect, the tips twining; height 30 to 36 inches; medium late; pubescence tawny; flowers both purple and white; pods large, $1\frac{3}{4}$ to $2\frac{1}{4}$ inches long, tumid, half crowded, shattering little; seeds brown, large, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown one season.
- 23297 B. A selection out of the original seed. Plants slender, suberect, the tips twining; height 30 to 36 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, compressed, half crowded, shattering little; seeds straw-yellow, medium-sized, $8\frac{1}{2}$ to 9 mm. long, oblong, much flattened; hilum slate-black; germ yellow. Grown two seasons.
23299. From Tsintse, China, 1908. Plants slender, erect, the tips twining; height 42 to 48 inches; late; pubescence tawny; flowers purple; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, scattered, shattering little; seed black with yellow saddle, large, 9 to $9\frac{1}{2}$ mm. long, elliptical, much flattened; hilum black; germ yellow. Grown one season. This is said to be a rare local variety of soy bean used as a vegetable when slightly sprouted.
23303. From Shiling, Chihli, China, 1908. Plants stout, erect, bushy; height 14 to 30 inches; medium late; pubescence gray (70 per cent) and tawny (30 per cent); flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, half crowded, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown to nearly black; germ yellow. Grown two seasons. This variety is said to be used all through northern China for making bean curd and bean vermicelli.
- 23303 A. A selection out of the original seed. Plants stout, erect, bushy; height 20 to 24 inches; medium late; pubescence tawny; flowers purple; pods medium large, $1\frac{3}{4}$ to 2 inches long, compressed, half crowded, shattering little; seeds chromium green, medium-sized; 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum black; germ green. Grown one season.
23305. From Peking, Chihli, China, 1908. Seeds yellow, but all failed to germinate.
23306. From Peking, Chihli, China, 1908. Plants stout, erect, bushy; height 30 to 36 inches; medium late; pubescence tawny; flowers white; pods large, $1\frac{3}{4}$ to 2 inches long, tumid, half crowded, shattering little; seeds black, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown one season.
23311. From Shiling, Chihli, China, 1908. Plants slender, erect, the tips twining; height 36 to 40 inches; late; pubescence tawny; flowers white; pods medium large, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds chromium green, medium large, $7\frac{1}{2}$ to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum slate-black; germ green. Grown one season.
- 23311 A. Selected out of the original seed. Plants slender, erect; height 32 to 36 inches; medium late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, shattering little; seeds black, medium small; 7 to $7\frac{1}{2}$ mm. long, oblong, much flattened; hilum pale; germ yellow. Grown one season.
- 23311 B. A selection out of the original seed. Plants stout, erect, bushy; height 30 to 36 inches; pubescence tawny; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, crowded, shattering little; seeds black and yellow, medium small, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown one season.

23312. From Paotingfu, Chihli, China, 1908. Plants slender, erect; height 24 to 30 inches; medium late; pubescence gray; flowers both purple and white; pods medium small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, tumid, shattering little; seeds olive-yellow, small, 6 to $6\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown two seasons.
23325. From Canton, Kwangtung, China, 1908. Plants stout, erect, bushy; height 12 to 16 inches; medium late; pubescence tawny; flowers purple; pods medium small, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering moderately; seeds black, small, 6 to $6\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
23326. From Canton, Kwangtung, China. Seeds olive-yellow; all failed to germinate.
23327. From Canton, Kwangtung, China, 1908. Seeds olive-yellow; none germinated.
23336. From Shanghai, Kiangsu, China, 1908. This is the same as 20798, secured at the same place.
23337. From Shanghai, Kiangsu, China, 1908. Identical with 20797, from the same place.
23338. From Shanghai, Kiangsu, China, 1908. Plants slender, erect, very leafy; height 48 to 60 inches; very late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, tumid, scattered, shattering little; seeds brown with more or less black usually in concentric bands, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season. Notes taken at Jackson, Tenn.
- 23338 B. A selection out of the original seed. Plants slender, erect, the tips twining; height 30 to 40 inches; very late; pubescence tawny; flowers purple; pods scattered; seeds black, large, 8 to 9 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
23522. From Chungking, Szechwan, China, 1908. Seeds olive-yellow; none germinated.
23523. From Chungking, Szechwan, China, 1908. Plants stout, erect, bushy; height 14 to 20 inches; late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, tumid, crowded, shattering moderately; seeds black, medium-sized, $6\frac{1}{2}$ to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
23544. From Ningyuenfu, Szechwan, China, 1908. Seeds yellow; none viable.
23545. From Ningyuenfu, Szechwan, China, 1908. Seeds yellow; none grew.
23546. From Ningyuenfu, Szechwan, China, 1908. Plants stout, erect, bushy; height 38 to 42 inches; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds black, very small, 5 to $5\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
24180. From Soochow, Kiangsu, China, 1908. Plants stout, erect, bushy; height 14 to 20 inches; medium late; pubescence tawny; flowers purple; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, tumid, crowded, shattering moderately; seeds black, large, 9 to $9\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
24181. From Soochow, Kiangsu, China, 1908. Plants stout, erect, bushy; height 18 to 24 inches; medium; pubescence gray; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, tumid, half-crowded, shattering little; seeds straw-yellow, medium large, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown one season.
24182. From Soochow, Kiangsu, China, 1908. Seeds green; none viable.

24183. From Soochow, Kiangsu, China, 1908. Plants stout, erect, bushy; height 16 to 20 inches; medium late; pubescence gray; flowers purple; pods large, 2 to $2\frac{1}{4}$ inches long, tumid, crowded, shattering little; seeds olive-yellow, medium-sized, 9 to $9\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum brown; germ yellow; leaves persist when pods are ripening. Grown one season.
24184. From Soochow, Kiangsu, China, 1908. Plants slender, erect, the tips twining; height 36 to 42 inches; late; pubescence gray; flowers purple; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, compressed, scattered, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown one season.
24610. *Trenton*. From Trenton, Ky. Found by Mr. S. J. Leavell in a field of the Mammoth variety in 1904. Plants stout, erect, bushy; height 32 to 38 inches; late; pubescence gray; flowers white; pods medium-sized, $1\frac{1}{2}$ to 2 inches long, compressed, scattered, shattering little; seeds brown, medium small, $6\frac{1}{2}$ to 7 mm. long, elliptical, much flattened; hilum pale; germ yellow. Except for color and shape of seeds, this variety is indistinguishable from Mammoth, 17280. Grown one season.
24641. From Taihoku, Formosa, 1909. Seeds yellow; all failed to germinate.
24642. From Taihoku, Formosa, 1909. Plants procumbent, vining, rather coarse; stems 52 to 60 inches long; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, tumid, scattered, shattering little; seeds black, small, 5 to $5\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season. A variety identical with this was received under No. 24643 (Taihoku, Formosa).
24643. From Taihoku, Formosa, 1909. Seeds black; none grew.
24672. From Khasi Hills, Assam, India, 1909. Plants stout, erect, bushy; height 42 to 48 inches; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds yellow, clouded with brown, small, $5\frac{1}{2}$ to 6 mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown one season.
- 24672 A. A selection out of the original seed. Plants slender, erect, the tips twining; height 36 to 42 inches; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{3}$ to $1\frac{1}{2}$ inches long, tumid, scattered, shattering little; seeds brown, small, $5\frac{1}{2}$ to 6 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
- 24672 B. A selection out of the original seed. Plants stout, erect, bushy; height 24 to 32 inches; very late; pubescence tawny; flowers purple; pods small, 1 to $1\frac{1}{4}$ inches long, tumid, scattered, shattering little; seeds straw-yellow, small, $5\frac{1}{2}$ to 6 mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown one season.
24673. From Darjiling, Assam, India, 1909. Plants procumbent, vining, rather coarse; stems 48 to 60 inches long; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds brown, small, 5 to $5\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.
24674. From Darjiling, Assam, India, 1909. Plants procumbent, vining, rather coarse; stems 48 to 56 inches long; very late; pubescence tawny; flowers purple; pods medium small, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds straw-yellow, small, 6 to $6\frac{1}{2}$ mm. long, elliptical, much flattened; hilum brown; germ yellow. Grown one season.

24675. From Safipur, Unao, United Provinces, India, 1909. Plants procumbent, vining, rather coarse; stems 48 to 60 inches long; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds black, small, $5\frac{1}{2}$ to 6 mm. long, oblong, much flattened; germ yellow. Grown one season. The following lots, all from India, were found to be identical with this: 24676, from Hasangani; 24677, from Ranjitpurwa; 24678, 24679, 24680, 24683, 24686, from Etawah; 24681, from Mainpuri; 24688, from Cawnpore; 24689, from Dehra Dun.
24676. From Hasangani, Unao, U. P., India. Identical with 24675.
24677. From Ranjitpurwa, Unao, U. P., India. Identical with 24675.
24678. From Etawah, Unao, U. P., India. Identical with 24675.
24679. From Etawah, Unao, U. P., India. Identical with 24675.
24680. From Etawah, Unao, U. P., India. Identical with 24675.
24681. From Mainpuri, U. P., India. Identical with 24675.
24682. From Mainpuri, U. P., India, 1909. Plants stout, erect, bushy; height 18 to 24 inches; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds black, very small, 5 to $5\frac{1}{2}$ mm. long, oblong, much flattened; germ yellow. Grown one season. Nos. 24684 and 24685, from Etawah, India, are identical with this variety.
24683. From Etawah, Unao, U. P., India. Identical with 24675.
24684. From Etawah, Unao, U. P., India. Identical with 24682.
24685. From Etawah, Unao, U. P., India. Identical with 24682.
24686. From Etawah, Unao, U. P., India. Identical with 24675.
24687. From United Provinces, India. Did not germinate.
24688. From Cawnpore, India. This proved to be identical with No. 24675.
24689. From Cawnpore, India. This is identical with No. 24675.
24690. From Dehra Dun, U. P., India. Did not germinate.
- 24693 to 24711, inclusive. Nineteen Japanese varieties of soy beans grown on Poona Farm, Bombay Presidency, India. All of these failed to germinate, except 24695.
24695. From Poona, Bombay, India, 1909, originally from Japan. Plants stout, erect, bushy; height 28 to 32 inches; late; pubescence gray; flowers purple; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, crowded, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{4}$ mm. long; elliptical, much flattened; hilum pale; germ yellow. Grown one season.
24839. From Shanghai, Kiangsu, China, 1906. Plants stout, erect, bushy; height 32 to 36 inches; very late; pubescence tawny; flowers white; pods large, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches long, compressed, scattered, shattering little; seeds olive-yellow, medium large, $7\frac{1}{2}$ to 8 mm. long; elliptical, slightly flattened; hilum slate-black; germ yellow. Grown four seasons.
24840. From Shanghai, China, 1906. Plants stout, erect, bushy; height 32 to 36 inches; very late; pubescence gray; flowers purple; pods large, $1\frac{3}{4}$ to $2\frac{1}{4}$ inches long, tumid, scattered, shattering little; seeds straw-yellow, large, $8\frac{1}{2}$ to 9 mm. long, elliptical, slightly flattened; hilum seal-brown; germ yellow. Grown three seasons.
25093. *Mammoth*. From Hickory, N. C.
25118. From Pithoragarh, Kumaon District, India, 1909. Plants procumbent, vining, rather coarse; stems 48 to 60 inches long; very late; pubescence tawny; flowers purple; pods small, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds black, marbled with brown, small, 5 to 6 mm. long, oblong, much flattened; hilum pale; germ yellow. Grown one season.

25130. *Early Brown*. From Knoxville, Tenn., 1909. Plants stout, erect, bushy; height 18 to 24 inches; medium early; pubescence tawny; flowers purple; pods medium-sized, 2 to $2\frac{1}{2}$ inches long, tumid, half crowded, shattering little; seeds brown, medium-sized, $7\frac{1}{2}$ to 8 mm. long, elliptical, much flattened; hilum pale; germ yellow. Except for color of seeds and maturity, this variety is difficult to distinguish from Ito San, 17268. Grown one season. No. 25161, from the Indiana Agricultural Experiment Station, is the same.
25131. From Knoxville, Tenn., 1909. Plants stout, erect, bushy; height 30 to 36 inches; medium late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{3}{4}$ to $2\frac{1}{2}$ inches long, compressed, half crowded, shattering much; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum light brown; germ yellow. Grown one season.
25133. From Soochow, China, 1909. Plants slender, suberect, the tips twining; stems 48 to 60 inches long; very late; pubescence both gray and tawny; flowers purple; pods scattered; seeds straw-yellow, small, $5\frac{1}{2}$ to 6 mm. long, elliptical, much flattened; hilum light brown; germ yellow. Grown one season. This variety is said to be the smallest grown at Soochow, and is used only for bean sprouts.
25134. From Soochow, China, 1909. Plants slender, suberect, the tips twining; stems 36 to 42 inches long; very late; pubescence gray; flowers purple; pods large, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches long, compressed, scattered; seeds straw-yellow, large, 9 to $9\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown one season.
- 25134 A. A selection out of the original seed. Plants slender, suberect, the tips twining; stems 42 to 48 inches long; very late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, tumid, scattered, shattering little; seeds straw-yellow, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light to dark brown; germ yellow. Grown one season.
25135. From Soochow, Kiangsu, China, 1909. Plants slender, erect, the tips twining; height 40 to 46 inches; very late; pubescence tawny; flowers purple; pods large, 2 to $2\frac{1}{2}$ inches long, scattered, shattering little; seeds chromium green, large, $7\frac{1}{2}$ to 8 mm. long, elliptical, slightly flattened; hilum slate-colored; germ green. Grown one season. This variety may be put to all uses of the soy, but in practice it is used only to make parched Sutt beans, eaten as a relish.
25136. From Soochow, Kiangsu, China, 1909. Plants slender, suberect, the tips twining; stems 48 to 56 inches long; very late; pubescence tawny; flowers purple; pods large, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds brown, very large, 9 to 10 mm. long; elliptical, slightly flattened; hilum pale; germ yellow. Grown one season. This variety is said to be the largest of all the soys at Soochow. It is used only for eating in the green state, but may be used for all the soy purposes.
25137. From Soochow, Kiangsu, China, 1909. Plants procumbent, vining, rather coarse; stems 36 to 42 inches long; very late; pubescence tawny; flowers purple; pods scattered; seeds brown and black, the colors concentrated in bands, large, 9 to $9\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum pale; germ yellow. Grown one season.
25138. From Soochow, Kiangsu, China, 1909. This is identical with the wild soy bean, No. 22428. Grown one season. (See Pl. II, fig. 1.)

25161. *Early Brown*. From Indiana Agricultural Experiment Station, 1909. Identical with 25130.

This variety was obtained originally by the Indiana Agricultural Experiment Station from Mr. E. F. Diehl, Leesburg, Ind., who writes that he had two varieties, an Early Yellow and the Early Black, which he tested side by side. In the progeny, he noted a few seeds that were partly brown and yellow in color, the one gradually shading into the other. Out of curiosity, he selected and planted the seeds with the largest amount of brown and within a few years secured the brown-seeded variety which has been called Early Brown.

Among seeds of the Ito San variety grown at the Kansas Agricultural Experiment Station were many in which the seed was partially brown, undoubtedly due to the influence of crossing.

25162. *Mammoth*. From Columbia, Tenn.

25212. From Botanic Gardens, Bremen, Germany, 1909. This proved to be the same as 21755.

- 25212 A. Black seeds mixed with the preceding. Produced plants identical with Buckshot, 17251.

25437. From Yachow, Szechwan, China, 1909. Plants slender, erect, the tips twining; height 48 to 56 inches; very late; pubescence gray (60 per cent) and tawny (40 per cent); flowers white; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds straw-yellow, medium-sized, 6 to $6\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown one season.

- 25437 A. A selection out of the original seed. Plants stout, erect, bushy; height 32 to 38 inches; very late; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds chromium green, medium-sized, $6\frac{1}{2}$ to 7 mm. long; elliptical, slightly flattened; hilum russet; germ green. Grown one season.

- 25437 B. A selection from the original seed. Plants stout, erect, bushy; height 26 to 32 inches; very late; pubescence tawny; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, half crowded; shattering little; seeds black, medium-sized, 6 to 7 mm. long, elliptical, slightly flattened; hilum pale; germ green. Grown one season.

- 25437 C. A selection out of the original seed. Plants stout, erect, bushy; height 36 to 40 inches; very late; pubescence tawny; flowers both purple and white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, half crowded, shattering little; seeds brown, medium-sized, $6\frac{1}{2}$ to 7 mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown one season.

25438. From Yachow, Szechwan, China, 1909. Plants slender, erect, the tips twining; height 30 to 36 inches; very late; pubescence tawny; flowers white; pods medium-sized, $1\frac{3}{4}$ to 2 inches long, compressed, scattered, shattering little; seeds chromium green, medium small, 6 to 7 mm. long, elliptical, slightly flattened; hilum slate-colored; germ green. Grown one season.

- 25438 A. A selection out of the original seed. Plants slender, erect, the tips twining; height 34 to 38 inches; very late; pubescence both gray and tawny; flowers both purple and white; pods medium large, $1\frac{1}{4}$ to $2\frac{1}{4}$ inches long, compressed, scattered, shattering little; seeds olive-yellow, medium-sized, $6\frac{1}{2}$ to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum light brown; germ yellow. Grown one season.

- 25438 B. A selection out of the original seed. Plants slender, erect, the tips twining; height 36 to 40 inches; very late; pubescence both gray and tawny; flowers white; pods medium-sized, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum seal-brown; germ yellow. Grown one season.
25468. *Wisconsin Black*. From L. L. Olds Seed Company, Madison, Wis., 1909, secured by that company from the Wisconsin Agricultural Experiment Station. Plants stout, erect, bushy; height 16 to 20 inches; medium; pubescence tawny; flowers purple; pods medium-sized, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long, compressed, half crowded, shattering little; seeds black, medium-sized, 8 to $8\frac{1}{2}$ mm. long, elliptical, much flattened; hilum pale; germ yellow. Grown nine seasons. This variety has proved to be one of the earliest growing in Wisconsin. While the records are somewhat incomplete, it is almost certainly the direct descendant of S. P. I. No. 5039, received from Vilmorin-Andrieux & Co., Paris, France, 1900.
27498. From Peking, Chihli, China, 1909. Plants slender, erect, the tips twining; height 42 to 48 inches; late; pubescence gray; flowers both purple and white; pods medium-sized, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches long, tumid, half crowded, shattering little; seeds chromium green, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, slightly flattened; hilum black; germ green. Grown one season.
27499. From Ingang, Fukien, China, 1909. Plants slender, erect, the tips twining; height 36 to 42 inches; very late; pubescence tawny; flowers purple; pods scattered; seeds straw-yellow, $5\frac{1}{2}$ to 6 mm. long, elliptical, slightly flattened; hilum seal-brown; germ yellow. Grown one season.
27500. From Shanghai, Kiangsu, China, 1909. Plants stout, erect, bushy; height 26 to 32 inches; very late; pubescence tawny; flowers purple; pods medium large, 2 to $2\frac{1}{4}$ inches long, compressed, half crowded, shattering little; seeds straw-yellow, medium-sized, 7 to $7\frac{1}{2}$ mm. long, elliptical, much flattened; hilum light brown; germ yellow. Grown one season.
27501. From Shanghai, Kiangsu, China, 1909. Plants stout, erect, bushy; height 36 to 42 inches; very late; pubescence tawny; flowers purple; pods large, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches long, compressed, scattered, shattering little; seeds olive-yellow, cloudy, large, $9\frac{1}{2}$ to 10 mm. long, elliptical, slightly flattened; hilum black; germ yellow. Grown one season.

THE BEST VARIETIES OF SOY BEANS.

It is difficult to determine the best soy-bean varieties out of those tested, not only on account of the very large number, but also owing to the divergent results reached at the various places where they have been grown. The soy bean seems to be peculiarly subject to fluctuations brought about by change of soil or change of climate. The differences in behavior of the same pedigreed seed in different places is often very striking, so much so that it is difficult to believe that it is the same variety. Whether these differences are due mainly to climate or to soil is difficult to determine, but in general the results indicate that both factors are potent. On this account it may very well be that the final conclusions reached by experimenters as to the best varieties will depend upon the place where the experiments have been conducted. The list of the best varieties

here given is a tentative one based primarily upon the results at Arlington Experimental Farm, but those obtained in cooperation with various experiment stations have also been given due consideration. These matters should be given careful weight by all experimental agronomists, as otherwise it is conceivable that really valuable varieties may be overlooked or may be too hastily discarded.

Very early.—Ogemaw, 17258.

Early.—Early Brown, 25161; and Vireo, 22874.

Medium early.—Chernie, 18227; Auburn, 21079 A; Merko, 20412; Elton, 20406; Chestnut, 20405 B.

Medium.—Ito San, 17268; Medium Yellow, 17269; Tashing, 20854; Shingto, 21079; Swan, 22379; Brindle, 20407; Sedo, 23229; Lowrie, 22898 A.

Medium late.—Brooks, 16789; Flava, 16789 A; Cloud, 16790; Ebony, 17254; Haberlandt, 17271; Peking, 17852 B; Wilson, 19183; Taha, 21999; Austin, 17263.

Late.—Mammoth, 17280; Edward, 14953; Acme, 14954; Flat King, 17252; Tokyo, 17264; Hope, 17267; Hollybrook, 17278; Farnham, 22312.

Very late.—Barchet, 20798; Riceland, 20797.

PLATES.



DESCRIPTION OF PLATES.

PLATE I. Plant of the wild soy bean, No. 22428, grown in greenhouse. Note the very slender stems, vining habit, and small, scattered pods.

PLATE II. Fig. 1.—Wild soy bean from Soochow, China, No. 25138, grown at Arlington Experimental Farm, 1908. This variety could not be distinguished from No. 22428 when grown side by side. Note the slender vining stems and procumbent habit. Fig. 2.—Soy bean from Cawnpore, India, No. 24689, grown at Arlington Experimental Farm, 1909. This variety is very similar in habit to No. 25138, but is so late that it did not even bloom at Arlington.

PLATE III. Variety tests of soy beans at Arlington Experimental Farm. Note the erect, bushy habit, and differences in size and earliness.

PLATE IV. Seven varieties of soy beans, showing types of habit. No. 17852, Meyer; No. 17852 B, Peking; No. 17263, Austin; No. 18259, Pingsu; No. 22504, unnamed; No. 17278, Hollybrook; No. 17271, Haberlandt.

PLATE V. The same seven plants shown in Plate IV, after hanging in a dry room for six months. All have shattered badly but No. 17852 B, Peking.

PLATE VI. Pods of soy beans, showing range in size and shape. Most of the varieties have three seeds to the pod, two and four being only occasional numbers. (Natural size.)

PLATE VII. Soy-bean pods; No. 19985 L, hairy and smooth pods from one heterozygote individual; No. 18258 C and No. 17278, smooth pods from heterozygote plants; No. 22898 A, a variety with tumid pods; No. 19186 B, a variety with much-compressed pods.

PLATE VIII. The seeds shown on this plate are as follows, beginning with the upper row and extending from left to right, there being two seeds of each variety: Row 1, Nos. 22882, 17278, 23297 B, 24674, 24641; row 2, Nos. 17251, 24180, 17252, 25656, 22899 A; row 3, Nos. 25118, 23546, 17255, 24685, 16790 B, 25138; row 4, Nos. 25136, 23229, 20406 G, 22644 A, 19186 D; row 5, Nos. 20412, 22333, 17256, 20409, 22411 A, row 6, Nos. 24182, 17252 B, 17857, 17271 L, 17260; row 7, 21079 L, 23299, 20407, 17852, 20797 A; row 8, 19985 L, 21079 M, 18258 C, 19982 A, 19982 A.



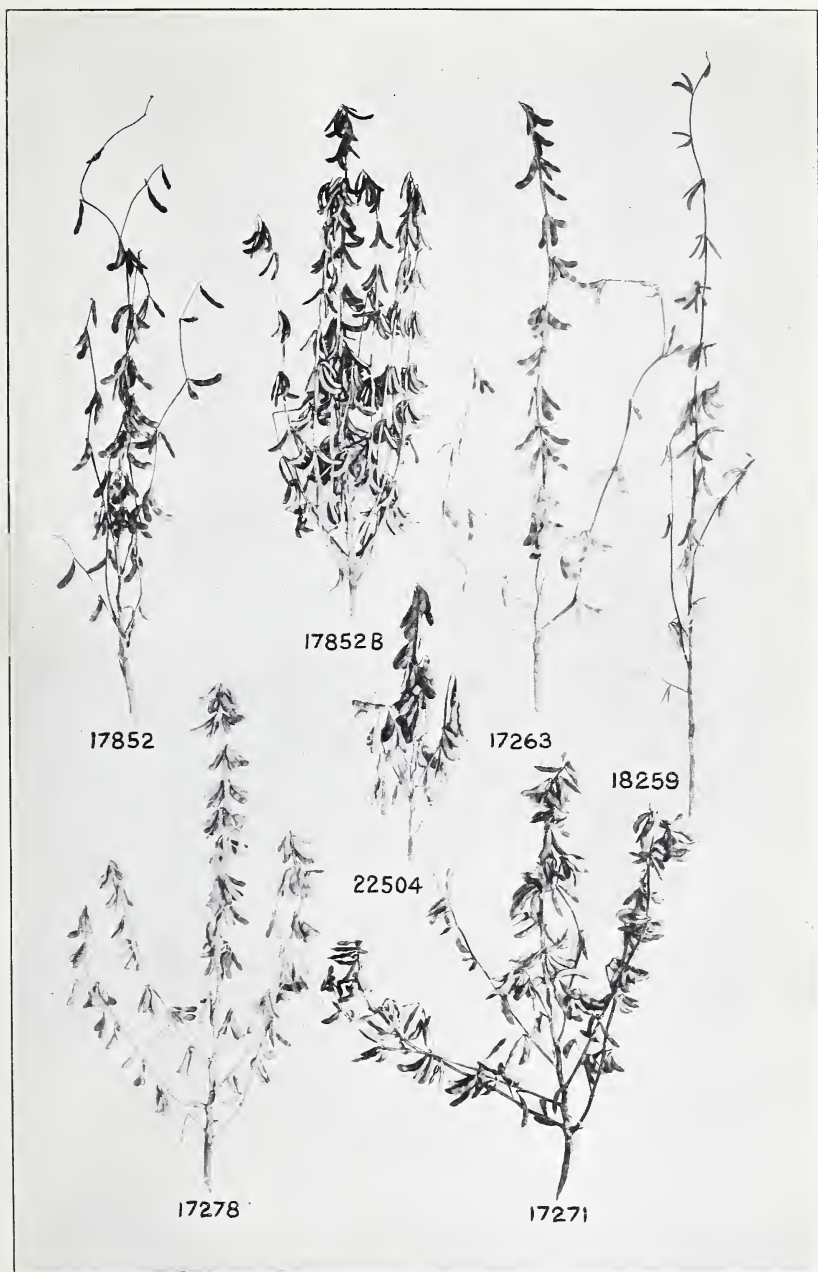
FIG. 1.—PLANTS OF A WILD SOY BEAN FROM SOOCHOW, CHINA, NO. 25138, GROWN AT THE ARLINGTON EXPERIMENTAL FARM, 1908.



FIG. 2.—PLANTS OF A SOY BEAN FROM CAWNPORE, INDIA, NO. 24689.

ROWS OF SOY BEANS GROWN IN THE VARIETY TESTS AT THE ARLINGTON EXPERIMENTAL FARM.

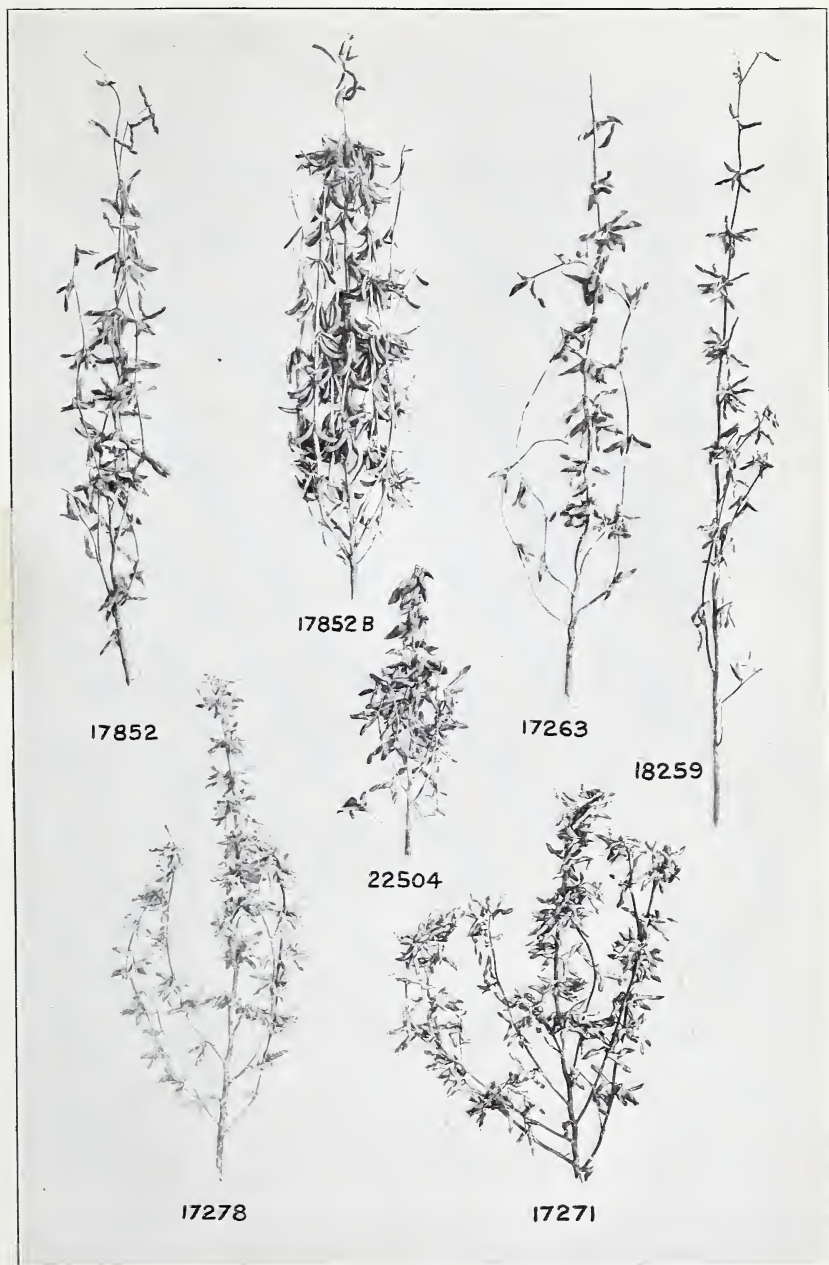




PLANTS OF SEVEN VARIETIES OF SOY BEANS, SHOWING TYPES OF HABIT.

No. 17852, Meyer; No. 17852 B, Peking; No. 17263, Austin; No. 18259, Pingsu; No. 22504, unnamed;
No. 17278, Hollybrook; No. 17271, Haberlandt.





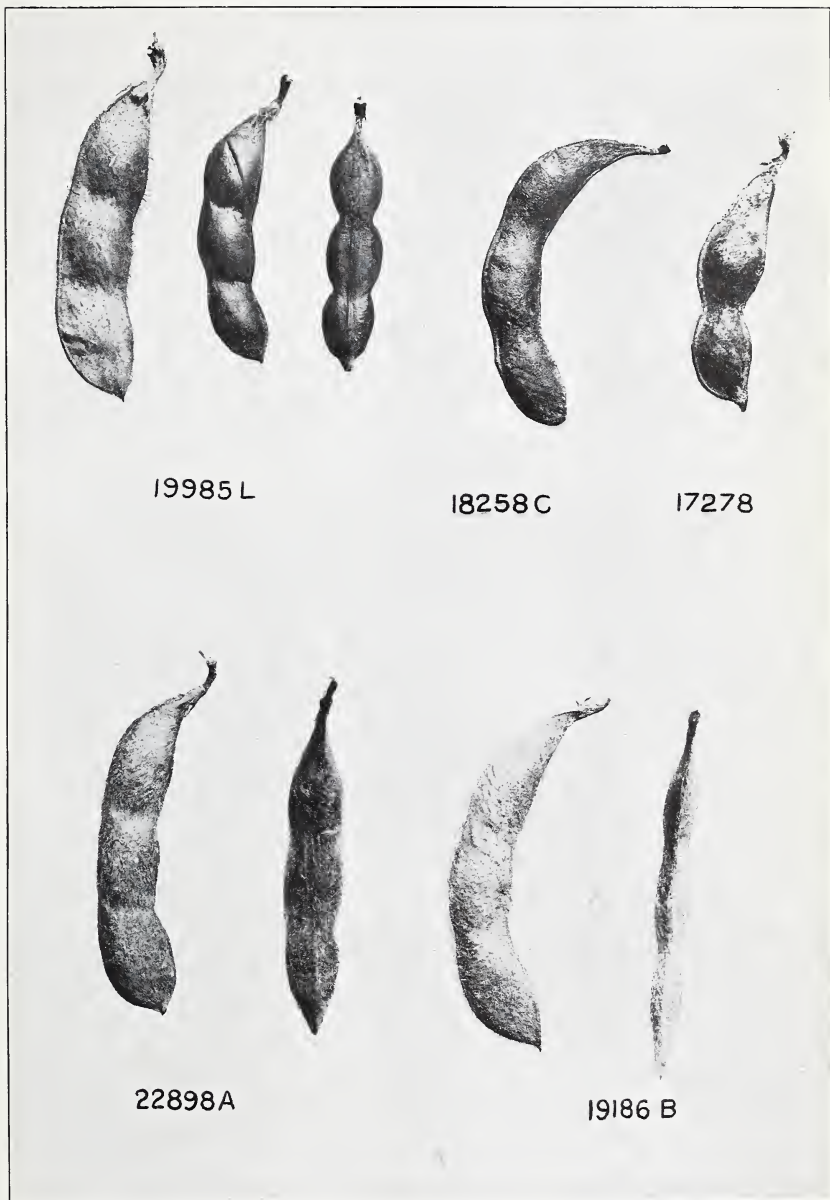
THE SAME PLANTS SHOWN IN PLATE IV AFTER HANGING IN A DRY ROOM FOR SIX MONTHS.

All have shattered badly but No. 17852 B, Peking.



PODS OF SOY BEANS, SHOWING THE RANGE IN SIZE AND SHAPE.
(Natural size.)

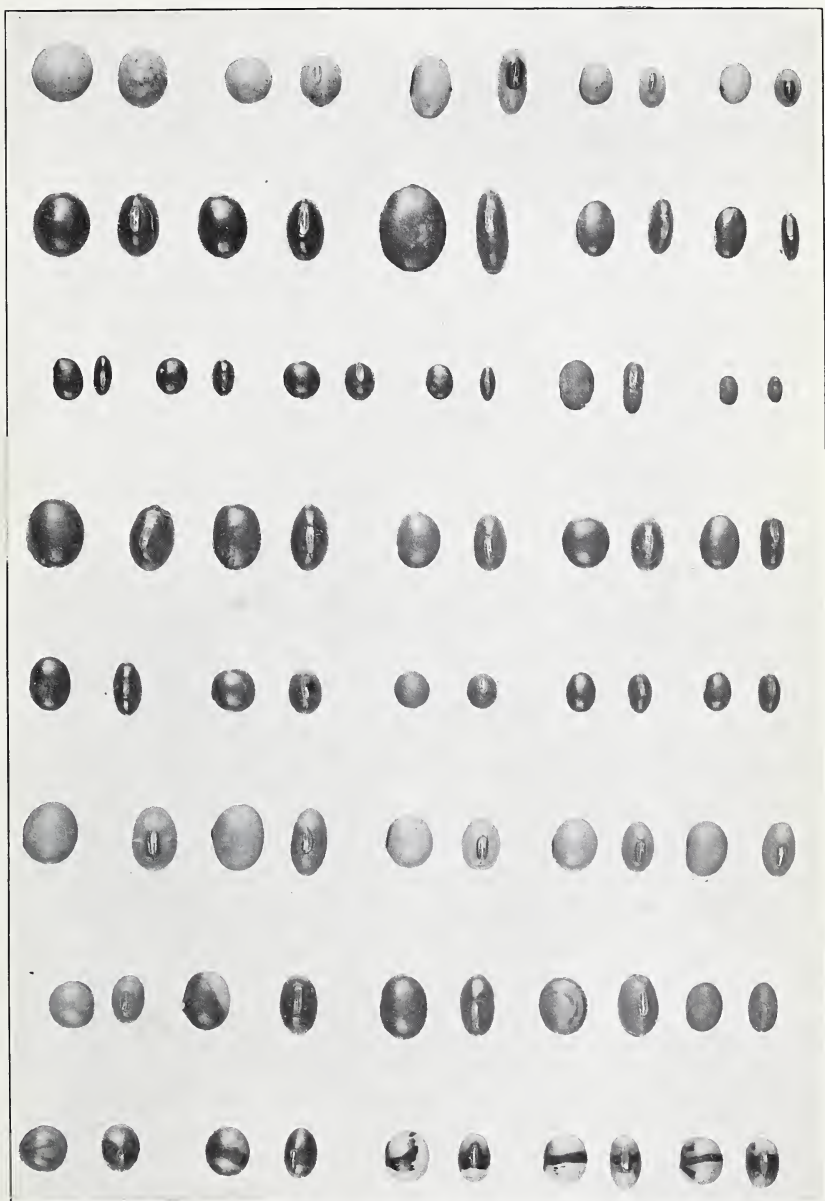




PODS OF SOY BEANS.

No. 19985 L, hairy and smooth pods from one heterozygote individual; No. 18258 C and No. 17278, smooth pods from heterozygote plants; No. 22898 A, a variety with tumid pods; No. 19186 B, a variety with much-compressed pods.





SEEDS OF 36 VARIETIES OF SOY BEANS, SHOWING VARIATION IN SIZE AND FORM.

The bottom row shows peculiar types of coloration that occur only on heterozygote plants.

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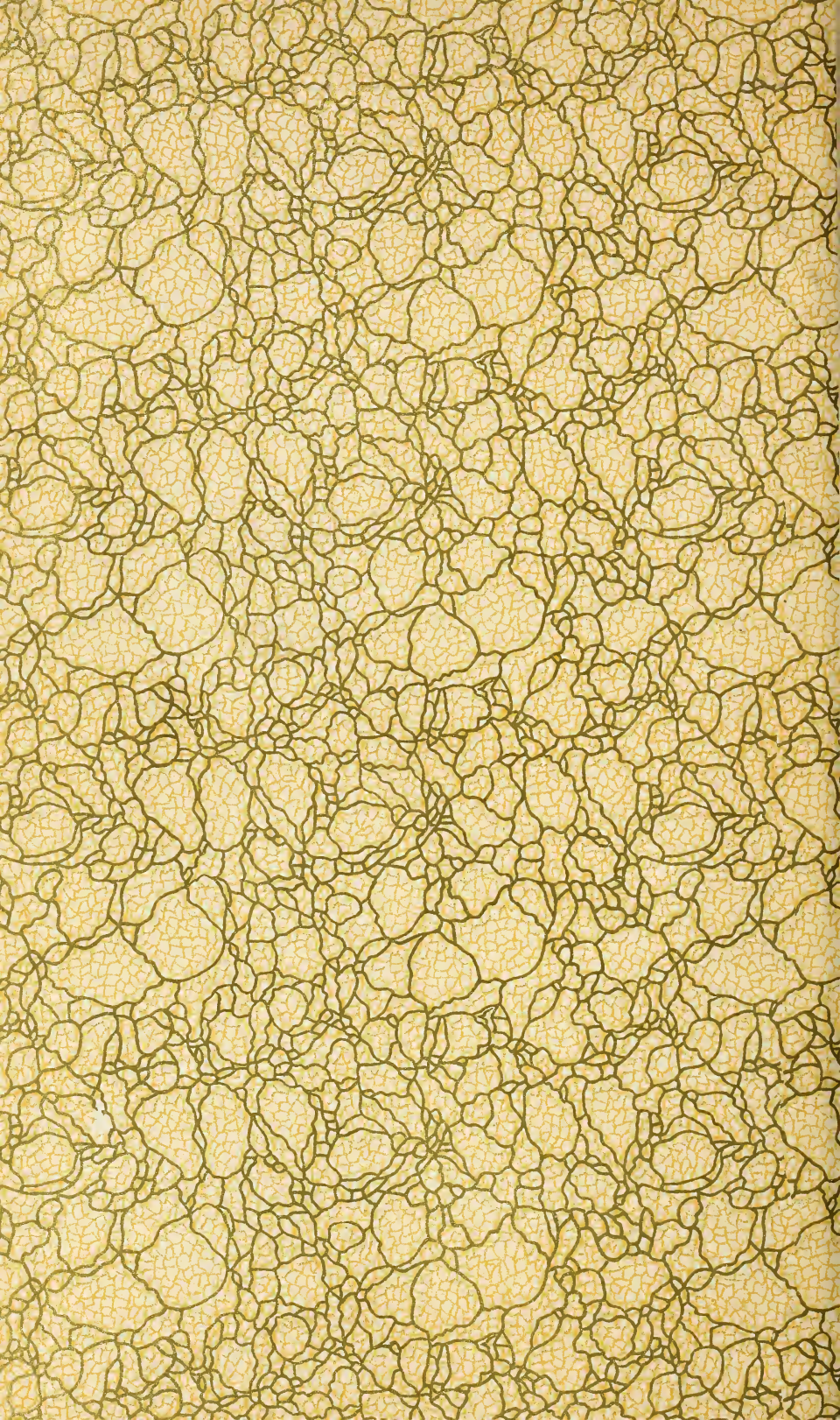
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